HIGH MOUNTAIN SHEEP

Impact Report

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

IMPACT SURVEY

An analysis of the effects of the High Mountain Sheep Dam and Reservoir on resources and management of the Nezperce National Forest, Northern Region; the Payette National Forest, Intermountain Region; and the Wallowa-Whitman National Forest, Pacific Northwest Region.

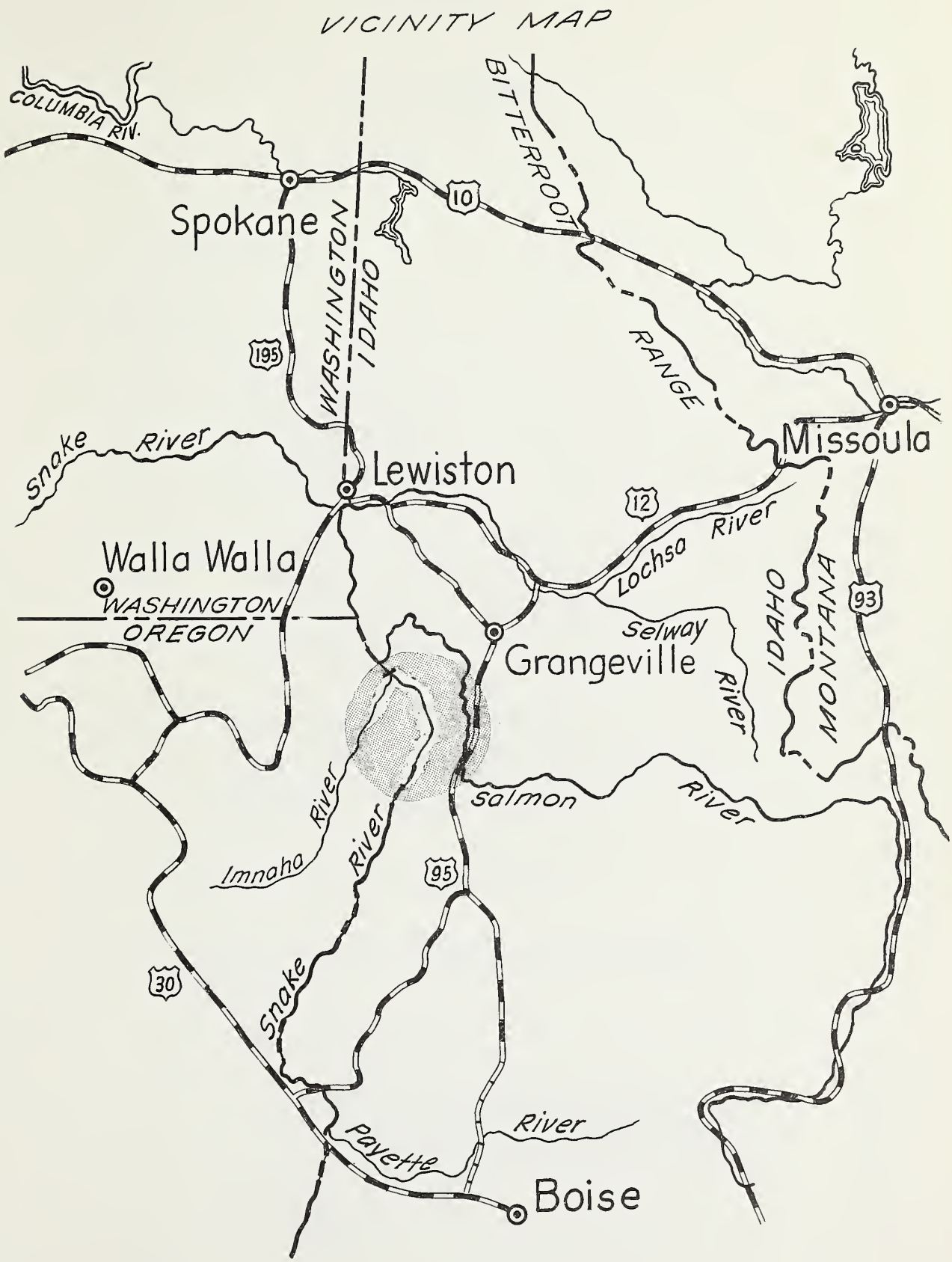
May 1966

APPROVED:

Regional Forester, Region 6

Regional Forester, Region 1

Regional Forester, Region 4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I. INTRODUCTION

A preliminary analysis of project impacts had formed the basis for the March 11, 1960, report from the Secretary of Agriculture to the Chairman of the Federal Power Commission. The studies for this report were in progress at the time the Federal Power Commission issued a license to Pacific Northwest Power Company, on February 5, 1964, to construct the High Mountain Sheep Project. This impact report includes new information gained by intensive study of the project area and a much larger associated impact area during the intervening years. It has been coordinated with multiple use management plans and area development plans made by the Forest Service since 1960 for the Snake River canyon and for the Hells Canyon-Seven Devils Scenic Area, dedicated in 1962.

The project area, the canyon slopes, the surrounding ridges and plateaus to the north and west, and the Seven Devils mountains to the east, are pictured as a vast, spectacular aggregate of which the portions are complementary and inseparable. There is full recognition that the project will directly or indirectly affect management and use of resources over practically the whole expanse. It is necessary that the project and the administration of the directly affected area be properly coordinated with the management programs for the total area.

The Forest Service has worked with the licensee and other interested agencies toward development of a mutually satisfactory Memorandum of Understanding. This would allow project construction and operation to be compatible with the purposes for which the affected National Forests were established. Although such an agreement has not been reached, the Forest Service will continue to work toward this objective.

II. GENERAL DATA ON PROJECT

A. Background Information

There are at present three basically similar proposals for construction of the High Mountain Sheep Project. Pacific Northwest Power Company, consisting of four participating power companies, with main office at Spokane, Washington, has Federal Power Commission License No. 2243 for construction of the project. The original application was made in March 1958, since amended, and license was granted February 5, 1964.

In 1963 the Bureau of Reclamation completed an in-Service (limited distribution) report for presentation to the Federal Power Commission. This report presents a plan for development of the Mountain Sheep site with Federal funds and with physical features of the dam and reservoir generally corresponding to the private power proposal. The Federal Power Commission has ruled against the Department of the Interior's application and the ruling has been appealed.

The Washington Public Power Supply System also has presented a plan for development of the High Mountain Sheep site, but was denied a license by the Federal Power Commission. The private, public power, and Federal proposals for construction include dams and reservoirs of similar general specifications. Operating characteristics are not similar.

B. Name of Project

In its application for license, Pacific Northwest Power Company refers to this project as "High Mountain Sheep." The Federal Power Commission assigned it No. 2243. The Bureau of Reclamation calls it the Mountain Sheep division of the Snake River Project. Some confusion exists because Pacific Northwest Power Company was denied a license on January 20, 1958, for Project No. 2173, which included a dam at an upstream site called Low Mountain Sheep. This report will refer to Project No. 2243 as "High Mountain Sheep" dam and reservoir.

C. Location of Project

The proposed dam would span the Snake River between Oregon and Idaho at River Mile 189.2 about 50 miles upstream (southeast) from Lewiston, Idaho. The left abutment would be located in NW¼NW¼, Section 11, Township 4 North, Range 48 East, Willamette Meridian. The right abutment would be in the SE¼SE¼, Section 14, Township 29 North, Range 4 West, Boise Meridian. The reservoir would extend in a generally southerly direction for about 58 miles to the tailwaters of the proposed Low Hells Canyon dam below Homestead, Oregon. A major arm would extend southward 10 miles up the Imnaha River, to slightly above the mouth of Horse Creek.

The reservoir shore line would extend into Wallowa County, Oregon, and Idaho and Adams Counties in Idaho. The left abutment of the dam would be on National Forest land within the Wallowa National Forest. The right abutment would

be located on lands administered by the Bureau of Land Management. The reservoir would reach into the Wallowa, Nezperce, and for less than two miles, the Payette National Forest.

D. Construction Access

One access route appears to be via State Highway 39 from the rail head at Joseph, Oregon, to the town of Imnaha. This is a paved two-lane highway for about 25 miles. The last five miles are graveled. From Imnaha to the dam site, about 32 miles of new construction would be needed. The major portion of this route was surveyed and cost estimates made in 1955 and 1956 by the Bechtel Corporation. An extension of the present water level route up the Snake River from Lewiston, Idaho, would serve the three dams as discussed in the Pacific Northwest Power Company's application for license: High Mountain Sheep, Lower Canyon, and China Gardens. Other possibilities exist, but none have been surveyed and all will involve far greater length of new construction.

E. Construction Camps

A construction camp will be established at Salmon Bar, below the mouth of the Salmon River. This bar is located about 0.6 mile below the dam site and is presently accessible to barge transportation of materials and heavy equipment from Lewiston, Idaho. There are about 12 acres of usable land on each side of the Snake River. The 12 acres on the Oregon side are National Forest land. A construction road will be built across National Forest land to Salmon Bar. Other construction camp possibilities are located along the access route between the dam site and the Imnaha River.

F. Description of Project

Proposal for construction includes dams and reservoirs of the following general specifications:

High Mountain Sheep

Type of dam	Concrete arch
Height of dam	670 feet
Full pool elevation	1,510
Minimum pool elevation	1,337
Full pool area	17,200 acres
Minimum pool area	9,000 acres

Maximum reservoir length	58.5 miles
Minimum reservoir length	46.8 miles
Gross storage	3,600,000 acre-feet
Usable storage	2,250,000 acre-feet

Operational characteristices (Exhibit I, Sheet 2, has been outdated by the Canadian Treaty and Pacific Northwest-Pacific Southwest Intertie since its presentation to the Federal Power Commission in September 1959. A new operational schedule has been requested from the FPC).

China Gardens

A re-regulating reservoir would be located downstream at the China Gardens site in the extreme southeast corner of the State of Washington. Although this dam will be located more than 3 miles north of Wallowa National Forest, the pool at 925 feet elevation would inundate National Forest lands along 9 river miles within the Forest boundary. This reservoir would have excellent winter recreation potential, particularly for fishing, as salmon move upstream into the Salmon River.

It is not presently known whether China Gardens dam would be built before, after, or in conjunction with High Mountain Sheep. It has been recommended to the Congress for authorization as a Federal project, and is also included with Lower Canyon as one of the three dams outlined in the High Mountain Sheep license application.

Lower Canyon

Construction of the High Mountain Sheep project leaves available a dam site at Lower Canyon, on the Salmon River just above its mouth. Lower Canyon and China Gardens dams were used in analyzing the comparative benefits of the High Mountain Sheep-Nezperce Projects.

Transmission Lines

There is no detailed plan presented for location of transmission lines from the project, either to connect to the existing Federal system, or for an entirely new system in addition to the Federal system. Transmission lines could have a major adverse impact on National Forest resources. It is impossible at this time to report upon the compatibility with National Forest purposes of an entirely new transmission system, or of requirements for the adequate protection and utilization of the Forest lands which may be affected by transmission lines, if found compatible.

The Forest Service will need to study proposals for these facilities before making recommendations to the Federal Power Commission on construction across National Forest lands.

III. Landownership and Project Boundary

A. Prior Withdrawals

The following withdrawals, from mineral entry, patent, or disposal, listed in chronological order, affect Federal lands which are or may be included within the boundaries of this project:

1. Power Site Classification 77 (12/4/09) and Power Site Reserve 77 (7/2/10).

   This was a temporary withdrawal along the Snake River in Washington, Oregon, and Idaho of 56,471 acres. It was made by legal subdivision in surveyed townships and in unsurveyed lands, involved every smallest legal subdivision any portion of which lay within one quarter mile of the Snake River. This withdrawal was revoked June 9, 1924, by Order of Restoration No. 388.

2. Power Site Classification 78 (6/18/24).

   This withdrawal was made under and pursuant to Act of Congress approved March 3, 1879 (20 Stat. 394). The classification has full force and effect under Section 24 of Act of Congress approved June 10, 1920 (41 Stat. 1063). The following lands were included in Oregon: All unsurveyed lands within one quarter mile of the Snake River in Township 5 North, Range 47 East and Range 48 East; Township 1 North, Range 50 East; Township 2 North, Range 50 East; Township 4 North, Range 50 East; Township 1 North, Range 51 East; Township 2 South and Township 3 South, Range 49 East; Township 1 South and Township 2 South, Range 50 East; Willamette Meridian. Specified surveyed lands in Township 4 North, Range 48 East and Range 49 East; Township 3 North, Range 50 East; and Township 2 North, Range 51 East, Willamette Meridian.

   The following lands were included in Idaho: All unsurveyed lands within one quarter mile of the Snake River in Township 26 and 27 North, Range 2 West; Township 21,

22, and 23 North, Range 3 West; Township 20 and 21 North, Range 4 West; also specified surveyed lands in Township 26 and 27 North, Range 1 West; Township 23, 24, and 25 North, Range 2 West; Township 23 North, Range 3 West and Township 20 North, Range 4 West, Boise Meridian.

3. Power Site Classification 263 (3/23/32).

This withdrawal was made under the same authority as No. 2 immediately preceding. Approximately 14,114 acres were withdrawn along the Imnaha River, including lands specified by legal subdivision in Township 2, 3, and 4 North, Range 48 East and Township 3 and 4 North, Range 49 East, Willamette Meridian.

4. First Form Reclamation Withdrawal (4/12/51).

The Acting Commissioner, Bureau of Reclamation made this withdrawal under authority delegated by Departmental Order No. 2515 of April 7, 1949 (14 F.R. 1937). The withdrawal was authorized by Section 3 of the Act of June 17, 1902 (32 Stat. 388). It included lands in the Hell's Canyon area of the High Mountain Sheep project in Township 3 South, Range 49 East, Sections 23, 26, 27, and 34, Willamette Meridian and also in Idaho on the Payette National Forest in Township 22 North, Range 3 West, Boise Meridian.

This withdrawal was revoked August 24, 1962, by Public Land Order 2734 (Oregon 010971) issued on July 19, 1962.

5. Power Site Classification 421 (11/30/51).

This withdrawal was made by W. H. Bradley, Acting Director, Geological Survey, Department of Interior, under authority of the Act of March 3, 1879 (20 Stat. 394; 43 U.S.C. 31) and Departmental Order No. 2333 of June 10, 1947, (43 C.F.R. 4.623; 12 F.R. 4024). The classification has full force and effect under the provision of Section 24 of the Act of June 10, 1920, as amended by Section 211 of the Act of August 25, 1935 (16 U.S.C. 818). It withdrew all National Forest lands not previously withdrawn along the Snake River below the 1000-foot contour from Asotin dam site to the mouth of the Salmon River and within the

1600-foot contour from the Salmon River to Hells Canyon dam site in unsurveyed townships. Withdrawal within surveyed townships was by legal description. The total area withdrawn was 15,122 acres.

B. Ownership Within the Flowage Area

Within the 1510-foot flow line, there will be a maximum increase in water level of about 50 feet on the Payette National Forest. This will occur in a steep, rock-walled canyon for about two miles below the Low Hells Canyon dam site. Only about 20 acres on the Payette National Forest will be inundated. Reservoir impact will be confined almost wholly to lands within the Nezperce and the Wallowa National Forests and other lands in Idaho. Land ownership is estimated to be as follows:

Estimated Ownerships Within Flowage Area	Acres	Percent
Wallowa National Forest	5,169	30.0
Private within Wallowa National Forest	2,509	14.6
Sub-Total - Oregon	7,678	(44.6)
Payette National Forest	20	
Nezperce National Forest	2,030	11.8
Private within Nezperce National Forest	1,225	7.1
Private outside Nezperce National Forest	2,660	15.5
State and Federal outside Nezperce NF	1,040	6.0
Sub-Total - Idaho	6,975	(40.6)
Snake River meandered area	2,547	14.8
Total surface area of reservoir	17,200	100.0

The Snake River is a navigable stream and land surveys have been meandered along its banks. This is not the case with the Imnaha River. The Imnaha's 202 acres of river bed and unvegetated bars are included in the Wallowa-Whitman total (101 acres private, 101 acres National Forest).

The total National Forest lands to be inundated by the proposed reservoir are thus 7,219 acres, or 42.0 percent of the total.

C. Project Boundaries

Pacific Northwest Power Company's license indicates a construction project boundary at elevation 1565 at the dam site and at elevation 1585 around the reservoir.

For National Forest purposes the final project boundary should be established at normal full pool elevation. This will allow multiple-use management of the maximum acreage of the lands surrounding the reservoir. In the vicinity of the dam, the project boundary should be held to that minimum necessary for project operation, including substation switchyard, operator village or any other facility which is to be located on lands under National Forest administration.

IV. Physical Characteristics of Area

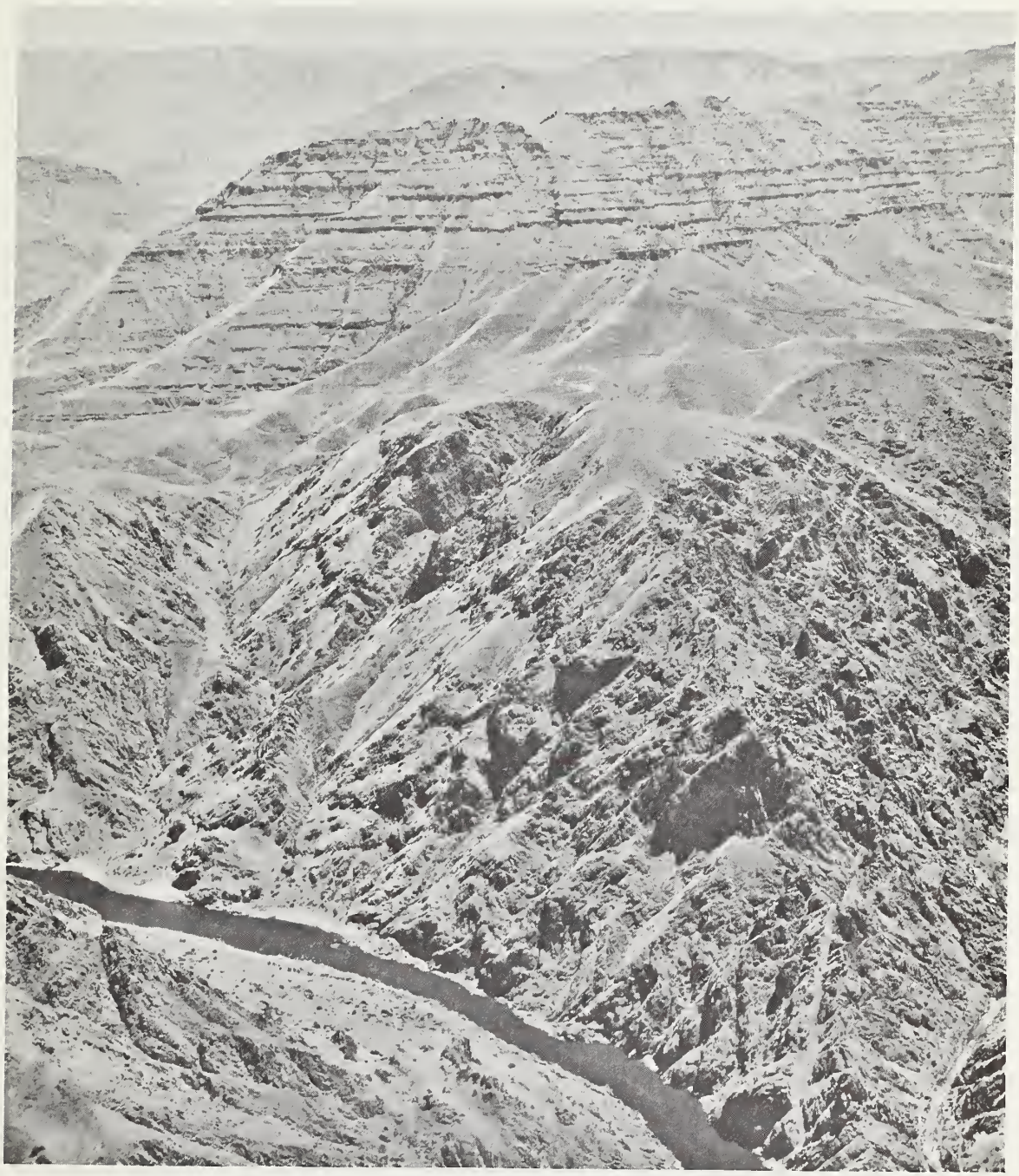
A. Major Impact Area - Zone Below 4,000 Feet Elevation

For millions of years, the Snake River has been carving out North America's deepest canyon in this area. From various places along the canyon rims one may observe differences in elevation as much as 5,700 feet. Short stretches of the river appear only here and there in the depths. Five miles beyond the gorge to the east, the peaks of the Seven Devils rise to almost 9,400 feet, a total difference in elevation exceeding 8,000 feet.

In many areas, notably the Hells Canyon and High Mountain Sheep Dam sites, the river flows through dark rocky gorges. Occasionally, the canyon widens as at Pittsburg Landing and Dug Bar. The river becomes more placid, and rich irrigated hay fields are found along the bars and bench lands. Grass clad slopes and benches, together with occasional pockets of brush or timber, provide habitat for wildlife and support a livestock industry of considerable local economic importance. At the higher elevations timber replaces grass as the principal ground cover in many areas.

The productive bench pastures of the lower Imnaha River suggest that in past ages this was a large lake bed. In more recent times the lake drained and the river cut a new gorge within the old lake bed, leaving remnants along both sides of the canyon a thousand feet above the present stream level. Smaller benches extend almost continuously around into the Snake River Canyon on the Oregon

PHYSICAL CHARACTERISTICS OF THE IMPACT AREA



As you traverse rugged lands from Pittsburgh Landing toward the damsite, timber is scarce and winter game range most important.

side as far upstream as Saddle Creek. These are much higher; at 3,000 to 4,500 feet elevation, they are only half way down from the west rim. Besides the Imnaha River, four streams of some consequence enter the canyon from the Oregon side. These are Deep Creek, Somers Creek, Temperance Creek, and Saddle Creek.

The Idaho side of the canyon is in many areas less steep and rocky. It is dissected by numerous fairly sizeable drainages. Sheep Creek and Granite Creek are the two largest streams.

Key values in the canyon area are grazing, wildlife habitat, and recreation. Watershed values are critical, not from the standpoint of quantity or importance of the runoff produced, but because of susceptibility of the soils to erosion.

Trees become scarce at the lower elevations, and are not common below 4,000 feet.

B. Zone Above 4,000 Feet Elevation

There is practically no flat land on either side of the Snake River Canyon between the benches at 3,000 to 4,500 foot elevation and the timbered tops of the main ridges. These ridges are Summit Ridge in Oregon and the Salmon-Snake Divide in Idaho. Both ridge tops slope downward to the north, ending where the Snake River is joined by the Imnaha and Salmon Rivers, respectively.

The flat top of Summit Ridge in Oregon resembles a long narrow plateau of up to two miles wide in places, and extending north from the McGraw and Hat Point areas at about 6,800 feet elevation to Lord Flat, at 5,200 feet. There is little flat land on the Salmon-Snake Divide except on the Joseph Plains, east of the dam site about 10 miles and north of the Nezperce Forest boundary. This area is largely private land, and is near the 4,800-foot elevation. In all sections of the canyon, land profiles between 4,000 feet and the ridge tops are generally very steep and often rocky.

Ground cover above 5,200 feet consists of mixed stands of lodgepole pine, Engelmann Spruce, white firs, and other species. Huckleberry and other low brush is a common understory. There are extensive meadows on the larger flats. Some of these are not very productive as the topsoil is

shallow. Because of the short growing season, dense thickets, smaller area, etc., the forage production capacity of these high flats is much less than that of the canyon lands below.

Both ridge top areas provide relief from high temperatures in the canyon bottom and have great recreation potential for scenic enjoyment during the summer months.

V. Broad Area Effect of the Project

The project will have its strongest influence on the immediate drainage area around the reservoir, which is the area of major consideration in this report. The agrarian way of life will undergo its first major change in the 80-odd years since the white settler replaced the Indian. The livestock industry can continue, but on a greatly reduced scale and with serious impediment by the reservoir and its recreational facilities. Without the project, livestock-recreation conflicts could have been reconciled for the forseeable future.

A delicate balance exists between summer and winter use of the livestock range. Each must be used to the proper degree at the proper time or overuse and damage will result. Either the loss of the canyon bottom to the reservoir resulting in displacement of big game populations, or an explosion of the population could upset the present balanced forage use.

Anadromous fish and certain forms of wildlife will have to cope with perhaps insurmountable alteration of their environment. A unique and picturesque recess of western America will be opened for the benefit of many, but the distinctive quality of its attractiveness will be lost forever.

There is a large potential for recreation development which has so far been inhibited by a short season, lack of adequate investment capital, and the need for more through travel routes. The present recreation season over the broad area does not extend much outside of July and August, except for big game hunters who come in October and November. A large low-elevation reservoir within the area will provide easy water level access into the canyon for most of the year. The amount of increased recreation will depend upon the wise and timely provision of facilities to accommodate recreationists.

The influx of large numbers of recreationists will necessitate earlier reconstruction of the road to Pittsburg Landing. The local communities will experience expansion of such businesses as sporting goods stores, motels, restaurants, and service stations.

One form of recreation will be replaced by another more common and more abundant form. A free-flowing river within a spectacular canyon will be replaced by a fluctuating reservoir. Downstream navigation will be aided by release of water during low-flow periods. Construction of the dam at this site, based upon present success at passing anadromous fish at high dams, will further reduce both commercial and sport fishing resources of the Columbia and Snake River.

The proposed dam and reservoir will not enhance present esthetic values, but rather make those remaining above the flowline available to a greatly increased number of people. A fine, rare, undisturbed white-water boating area will be sacrificed to form a fluctuating reservoir having in itself no unusual recreation value, but available to all. The dam will present a considerable attraction to the general public.

In addition, management of a much larger area tributary to the reservoir will need to be adjusted to accommodate project induced change. The timber resource will need to be managed with esthetics and a setting for recreation pursuits as a major consideration. A major adjustment in the availability of forage and cover for wildlife and domestic livestock will be required. Recreation use sites in the upland areas must be developed to accommodate the water oriented users who cannot be accommodated at waters edge or who wish relief from high summer temperatures. There must be a strengthened fire protection organization in the canyon bottoms. Acceleration of soil stabilization efforts in the tributary streams and installation of facilities to improve fish habitat will be required to partially offset the losses to be caused by inundation of the river. Transportation facilities will need upgrading and extension to accommodate the disruption of existing developed and natural transportation routes and to accommodate project induced increase in public use.

Predictions of project benefits have been made: There will be an ultimate generating capacity of 2,000,000 kilowatts or more of low-cost electricity. Storage will benefit flood control on the lower Columbia River to a limited degree.

LAND RESOURCE VALUES
WATER AND SOIL

A good vegetative cover is required to maintain soil stability on the steep terrain as shown in this picture taken from near Hat Point Lookout

VI. Detailed Analysis of Effects and Supporting Information

A. Land Resource Values

1. Water and Soil

Watershed management practices have been oriented toward maintenance of optimum soil productivity and vegetative cover through fire protection and careful range utilization. In 1960, aerial reseeding of grass was done on the large burned areas following fires on both sides of the canyon. Stabilization of the thin and often delicately poised soil mantle is of prime importance.

Other than to control sediment, production of maximum quantity or quality of water has thus far been a secondary objective in the canyon drainages. Domestic use of water is negligible. There are some stream diversions for irrigation of hay fields, notably at Temperance, Kurry, and Klopton Creeks. Several other such diversions existed, but were abandoned decades ago when the early homesteaders left the canyon. Livestock watering troughs and spring developments have been installed in many areas west of the river to promote uniform utilization of the forage resource by livestock and big game. Industrial use of water has been confined to placer mining along the river bars, and operation of the abandoned Winchester Mine mill on Battle Creek. Except for mining, there has been no industrial use of water within the canyon.

The canyon is subjected to extremely heavy concentrated summer rainstorms known locally as "waterspouts". These occur only occasionally, nearly always in conjunction with lightning storms. They have caused severe earth movement, even of boulders several feet in diameter. Roads have been blocked, culverts plugged, and fences ripped out. Storm clouds may be observed gathering over the canyon almost any summer afternoon. Generally by evening the steady west wind disperses them into Idaho. When the turbulence is great enough, however, unpredictable storms of astonishing violence may follow. They are apt to be most damaging where the soil has been disturbed or the protective vegetative cover has been reduced.

Most of the roads and trails within the area are constructed to a low standard with steep grades and minimum drainage.

Forest administration encourages improved methods of range management to stimulate increased ground cover, increase production of forage and to prevent erosion. This requires intensive supervision, by Forest officers and permittees, to insure proper distribution of livestock, proper seasons of use, and removal of livestock early enough in the spring to mature and set seed before the dry summer weather stops plant growth.

Experience has shown spring to be the most critical period of use, the one where damage to the soil and vegetative cover is most apt to occur. Private land owners are encouraged to avoid such practices as holding stock in pens or pastures on steep slopes where excessive trampling may compact soils or otherwise cause site deterioration.

Some of the worst slump, mass slippage, sheet and gully erosion is occurring on private lands within the Pittsburg, Somers, Kurry, and Dug Creek drainages. This is the result of past abuse. Federal cooperation is necessary to encourage land owners in rehabilitation of these areas.

One future need that will have to be met with or without the reservoir is the provision of a domestic water supply for developed recreation areas. Location of these areas will be governed by the presence of suitable flat ground and boat landings. Since springs or other pure water sources are not everywhere available in the canyons, the solution may require either drilled wells or long pipelines from protected and developed springs. Small development sites usually accessible only by boat will not necessarily be furnished potable water.

The heavy fine-textured soils of the canyon areas are noted for their fertility and waterholding properties. This, in part, explains the luxuriant growth of bunchgrass in a precipitation zone that, in many areas of the west, would result in a desert type of plant association. This very quality of the soil, combined with the steepness of the slopes, will surely compound the erosion problem around any storage reservoir constructed in this area. Drawdown will expose vast areas of saturated soil with the stabilizing plant cover removed or destroyed. Slippage of the soil mantle around

and below the flow line will in many areas remove support for the soils above. Similar conditions have been noted beginning around Brownlee and Oxbow Reservoirs with steep shorelines. Wave action also contributes to sliding and slumping.

Unless some means can be devised to forestall this type of erosion it is certain that irreparable damage will be done in many areas around the reservoir. A concurrent hazard to grazing livestock and human activity will be created, not to mention the difficulty of maintaining the proposed water line trail. Stabilization and repair of slide areas that develop as a result of the reservoir will be a continuing major responsibility of the licensee.

A detailed soil survey is needed in the canyon around the project area to determine probable effects of the pool and to aid in the determination of compatible levels of use of the various resources.

Many specific problems regarding watershed management will be encountered during the construction period. Danger of water pollution from construction villages will be serious and will require special precautions and/or treatment to prevent contamination. The increased fire hazard will require intensified fire protection to prevent an increase in burned areas with resultant severe exposure and damage to the highly erodible soils.

Complete relocation of existing transportation facilities will require the traversing of much more unstable ground than is presently crossed by the existing facility. Proper location and higher standards of construction will be necessary in order to protect water resource values. Soil stabilization problems will be more severe.

2. Recreation

The geographic region around the Snake River Canyon is characterized by snowy winters and dry summers. The Rocky Mountains protect the area from the cold waves which sweep down from the interior of Canada across the plains States. The Cascade Mountains in Oregon form a natural barrier across the path of the moisture laden winds from the Pacific Ocean.

Like most wide, deep canyons, this one has several climatic zones. The average annual precipitation in the canyon bottom

is six to ten inches, while the mountainous country immediately to the east and west receives 30 to 60 inches.

Temperature ranges are similar. While occasional severe winters occur, normal winters are mild at the lower elevations, but extreme temperatures of 115 degrees Fahrenheit often occur during summer afternoons. On the canyon rims, summers are cool, breezy and invigorating. For almost the entire year, some portion of the canyon has weather suitable for outdoor recreation.

Archeology and History

There is evidence that the Snake River canyon was inhabited by ancient Indian tribes who predated the modern Nezperce and Shoshone Indians encountered by Lewis and Clark in 1804. Pictographs are not plentiful but can be found at village sites and at the main river crossings. Petroglyphs are very scarce. These ancient writings are ascribed to prehistoric peoples since the later Indians have disclaimed any knowledge of them. From artifacts that have been found, it appears that ancient man lived along the major streams for most of the year, as did the Indians during the winters. Hot springs, once frequented by Indians, occur below the dam site, in Cook Creek and along the Idaho shore.

As far as contribution to knowledge of ancient tribes is concerned, the reservoir area presents significant possibilities.

No intensive archeological investigations have ever been made along the Snake River canyon below the Hells Canyon dam site. The past few years have seen sharply increased activity by unauthorized amateur artifact collectors.

It is imperative that a systematic investigation be started as soon as possible. The Forest Service will take an active part in all investigations within the boundary of the lands it administers. All investigations within National Forests will be conducted in accordance with the Antiquities Act.

The licensee should finance preliminary surveys of the project area in time to allow for the necessary exploration and excavation work. As required by the Antiquities Act, institutions conducting surveys and salvage on National Forest

lands will operate under permit procedure. Artifacts found on these lands are needed to fully interpret past history of the area. They would be displayed in Visitor Centers at the project. Exploration is also needed on existing private lands within the project area.

Many interesting historical sites will be inundated. Most are of local importance, but several have national or even international significance. Among these was the massacre of 31 Chinese placer miners at the mouth of Deep Creek on or about May 25, 1887. This foul deed was perpetrated by a group of white renegade horse thieves, none of whom were ever brought to justice. An international incident was caused, which resulted in payment by the United States of $276,610.75 in indemnities to the Imperial Chinese government.

A site of national significance in the settlement of the west is generally believed to exist at the upper end of Dug Bar. Known as "Chief Joseph's Crossing", it is the place where the Nezperce Indians crossed the Snake River when driven from their ancestral homeland in Wallawa County by General O. O. Howard, beginning what historians refer to as the Nezperce War in the spring of 1877. Chief Joseph's band of men, women and children are said to have crossed the Snake River in full flood with hundreds of head of cattle and horses without the loss of a human life or a single head of livestock. This was quite a tribute to a people whose acquaintance with horses and cattle had been for only a few generations.

One or more routes of the exploration parties of the early 1800's are believed to have passed close to the project area. It is possible that some evidence can be found to identify their actual path through the canyons.

a. Status in the Canyon Without the Project

There are major problems associated with the recreation development of the Snake and Imnaha River canyons as they exist today; briefly, these are summarized as follows:

(1) Better access is needed. However, new road construction must be very carefully planned and designed to avoid conflict with other resources and compounding of erosion problems.

(2) All types of recreation facilities must be developed. Since most of the gentle land is within patented homesteads, the land needed for these must be acquired from the private owners in most cases. Many of the larger sites suitable for recreation development are also vital to the continued operations of the stockmen.

(3) A suitable ground cover of trees and shrubs will be required on practically every low elevation site that is developed for recreation use.

(4) Sources of pure water are not available at over half the sites inventoried. Where water is available, distribution systems must be developed and protected from contamination.

(5) The fire hazard in the canyon is extreme for most of the year. Recreationists must be advised of the danger. Camping and picnic sites must be as fireproof as possible and must be surrounded by fire breaks.

The lack of adequate transportation will to a great extent limit the amount of use. Such use would be in the form of dispersed recreation with limited opportunities for mass recreation. The highly productive soils for big-game habitat will stimulate the dispersed type of recreation use, as will the critical need to obtain an adequate harvest of the big-game resource.

The Forest Service has not as yet constructed improved campgrounds along the Snake or lower Imnaha Rivers. Public use demands in more accessible areas have so far prevented development of recreation facilities within the canyon.

Without the project, this plan will include development of enough existing sites along the Snake and Imnaha Rivers to satisfy present needs. Existing transportation routes, both road and trail, would be improved. (New road access is planned down Sheep Creek.) Four sites are planned for development east of the Snake River. Four sites are also planned for development on the west side of the Snake and along the Imnaha River. All of these developments would require the

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
E.P. CLIFF, CHIEF

WALLOWA—WHITMAN (MINAM DIVISION)—NEZPERCE
& PAYETTE NATIONAL FOREST

HIGH MOUNTAIN SHEEP DAM & RESERVOIR IMPACT AREA

1964

Scale
0 ½ 1 2 3 4 5 6 Miles

PROPOSED TRANSPORTATION SYSTEM And RECREATION AREAS

LEGEND

- NATIONAL FOREST BOUNDARY
- PAVED ROAD
- ALL WEATHER ROAD
- DIRT ROAD
- PRIMITIVE ROAD
- TRAIL
- HELLS CANYON-SEVEN DEVILS SCENIC AREA

EXISTING

- PROBABLE ROUTE OF DAM ACCESS ROAD
- PROPOSED NAT'L. FOREST SYSTEM ROAD
- PAVED ROAD
- TRAIL
- RECREATION DEVELOPMENT

WASHINGTON
OREGON
IDAHO
SNAKE
Salmon River
PROPOSED HIGH MTN SHEEP DAM
HELLS CANYON — SEVEN DEVILS
PAYETTE NATIONAL FOREST
SCENIC AREA
NATIONAL RECREATION AREA
OREGON
IDAHO
WALLOWA BAKER
Zumwalt
Cuprum
Copperfield
Homestead
BOISE MERIDIAN
R. 1 E.
R. 1 W.
T. 28 N.
T27N
T26N
T25N
T24N
T23N
T22N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
T6S
R47E
R48E
R49E
R50E
R51E
EXISTING FOREST ROAD TO LOOKOUT POINT (FOOT AND DRIVE BEYOND THIS POINT)

purchase of private lands. Much of the private land in the canyons is in mineral claims or homesteads, described by metes and bounds surveys. These and the General Land Office surveys are mostly over 50 years old, with corners and boundaries now obliterated. Detailed examination of many of these areas must include a resurvey to determine the exact acreage to be required from private owners.

Without adequate water supply, the establishment of suitable plant growth on development sites in the canyon area will be difficult. Few sites were found where sufficient cover exists or can readily be established. Growing conditions on river bars are adverse due to high summer temperature, insufficient soil moisture, sandy conditions or other factors. Native vegetation is without exception too slow-growing or too short-lived to be satisfactory, although designs should allow existing trees and shrubs to be retained wherever possible.

Shady refuges from the sun's rays will be of vital importance to summer recreationists. Those unaccustomed to long hours in the sun at temperatures up to 115 degrees Fahrenheit run a severe risk of sunstroke or heat prostration. Around some of the old homesteads these tree species exist:

Black locust (Robinia pseudoacacia)

Tree of Heaven (Ailanthus altissima)

Osage orange (Maclura pomifera)

Russian mulberry (Morus alba var. tatarica)

English walnut (Juglans regia)

Weeping willow (Salix babylonica)

Lombardy poplar (Populus nigra var. italica)

California box-elder (Acer Negundo)

A few people fly in to hunt and fish, mainly from Joseph, Oregon, and Grangeville, Idaho. Charter pilots use unimproved landing strips within the canyon. Several sheep camp cabins or other privately-owned ranch buildings serve as overnight accommodations.

Hikers enter the canyon in the summer from Hat Point; the Imnaha River-Dug Bar area and Pittsburg Landing at all seasons. Principally, the objectives are fishing, sightseeing, and photography. Some entry by scooter-type vehicles is noted on the east side of the Snake where the trails are better suited to this type of travel. Most recreationists who come in by horseback are big-game hunters. They concentrate in the timbered areas at the higher elevations.

There are about eight commercial packers serving the area on the Oregon side. Many hunters use their own livestock.

Five commercial outfitters provide services from the Idaho side. Two are from Lewiston and three from the Salmon River area. The total of recent annual recreation visits to Pittsburg Landing have been estimated at 2,000. The highest periods of use occur during the spring months and again in the fall hunting season.

National Forest records show that in 1963 there were 19,000 visitor-days of use in the lower Imnaha River-Dug Bar area. Entry was by 1,846 vehicular recreation trips. Commercial boat operators brought in about 750 persons for a total of 3,000 visitor-days. Private boating use was computed from limited surveys to total about 400 visitors, with over 2,000 visitor-days. Hat Point Lookout reported 3,465 tourist visitor-days and 1,938 hunter visitor-days. Recreation visits can be increased many fold by modest transportation system improvements.

In 1963 there were three commercial boat operators who took about 750 persons into the Snake River canyon. Two operated from downstream at Lewiston, Idaho, and one from upstream at Homestead, Oregon. Each operator maintains a semi-permanent type overnight camp within the canyon. These are on National Forest lands, and are operated under special-use permits.

The second largest group of boaters who enter the canyon (about 400 in 1963) do so in privately owned craft from the Lewiston-Clarkston-Asotin area. There is room for expansion of private boating. Navigation between Johnson Bar and Battle Creek is so hazardous that this stretch is seldom attempted. Channel improvement on Sheep, Waterspout and Rush Creek Rapids in the upper


QUEEN


IDAHO QUEEN

reaches of the canyon will be necessary to permit boat travel. These rapids are too rough for safe passage of the most experienced pilot. Certain other areas become very difficult during the low-water period of late summer and fall. Use of the entire length of the canyon by floaters on rubber rafts is light but increasing.

The 130,000 acre Hells Canyon-Seven Devils Scenic Area lies in the upper, or south, end of the canyon. It extends for 22 miles along the Snake River and over the summit of the Seven Devils into Salmon River drainage. (See Recreation Area Map following Page 17.) Established by the Secretary of Agriculture in 1962 and named for its two main features, the area is located in three National Forests. In a scenic area, the use and development of other resources is managed so there will be no impairment of the outstanding scenic values which have been accorded priority.

A long-range plan for development of this scenic area includes three access roads into the east (Idaho) side, and four entrance roads on the west (Oregon) which will connect with a road down the Imnaha-Snake divide. Horse and foot trails will lead into the back country. There will be 55 campgrounds and picnic sites and 28 observation points established. Under the Forest Service development program the scenic area will be ready by 1972 to accommodate eight times the present 10,000 recreationists who visit the area each year.

The Snake River Limited Area comprises 203,230 acres of National Forest land in two blocks along the Oregon side of the Snake River. The southern block extends into the Imnaha drainage, including almost all of Horse, Cow, and Lightning Creeks. On its southern tip, it is overlapped by the Hells Canyon-Seven Devils Scenic Area. The limited area was designated by the Regional Forester in 1946 pending further study of its important resource values to determine that program of management which would permit its highest public use.

b. Adjusted Recreation Plans With the Project

Construction of a dam and reservoir in the Snake River Canyon will require intensive planning for and administration of the lands surrounding the project. Establishment of a comprehensive planning area under Forest Service administration could aid recognition and use by the

general public of the outstanding recreation potential both for water-oriented recreation and dispersed recreation associated with the scenic and game resources.

An intensive multiple use area plan with detailed resource analysis is completed on lands surrounding or affected by this project. It includes lands within the National Forests between the flow line and the main ridge tops. Adjacent lands outside National Forest boundaries whose use patterns could materially affect National Forest administration were studied in connection with this planning effort. Multiple-use management planning for the project-affected area is basic to the formulation of management plans for individual resources.

Existing district multiple use management plans covering the Snake River Canyon will be periodically updated to provide for the increasing intensity of resource use which will be more than normally accelerated by construction of this project. An inter-Regional recreation development and management plan has been completed through the rough draft stage. It recognizes the proposed reservoir as an integral part of the recreation complex from the Snake-Salmon divide to Summit Ridge.

It is expected that recreation opportunities on and around the High Mountain Sheep Reservoir will help fulfill needs for about 1,300,000 people living within a 600-mile radius of designated recreation sites. Projections indicate that the future population growth in this area will continue to greatly exceed the national average. People are traveling more miles for their recreation experiences, have more leisure time and more money to spend on recreation services, equipment, and trips. Forest Service projections of recreation demands have been confirmed by numerous State studies, research programs, and the Outdoor Recreation Resource Review Commission reports. Definite trends and projections in recreation activities have been established and are applicable to the High Mountain Sheep Reservoir.

Projects constructed, authorized, or licensed will soon provide an almost continuous chain of reservoirs extending from Weiser, Idaho, down the Snake and Columbia Rivers to Bonneville Dam, a short distance above Portland, Oregon. Other large lakes and reservoirs exist in the Northwest.

Despite this fact, all or large areas within the States of Idaho, Montana, Utah, Nevada, and the eastern portion of Washington and Oregon are considered to have a shortage of water surface area. Residents of this Region have demonstrated a willingness to travel long distances to take part in water-oriented recreation activities.

The potential recreation opportunities at this reservoir site are numerous. They include not only the water surface and adjacent sites, but also forested areas at nearby higher elevations. These high rims and peaks offer contrast to the canyons and present opportunities for development of campgrounds and overlooks. The Seven Devils to the east and Wallowa Mountains to the west, with their alpine lakes and scenery, will serve to enhance this low elevation reservoir. The most unique attraction of the reservoir, aside from the unusual scenic values, will be the opportunity for "back country" boating. There will be about 50 miles of the deepest portion of the canyon without road access, except at Pittsburg Landing and at either end. Utilization of the entire pool to the tailrace of Low Hells Canyon Dam will require channel improvement at Wild Sheep Rapids, near Battle Creek. These rapids will be exposed during drawdown and will constitute a serious hazard. All recreation planning and development must take into consideration the extreme fire risk and difficult fire control conditions within the Canyon. (See Fire Prevention, Preparation and Suppression, page 57.)

Since the reservoir site is distant from large population centers, it is desirable to plan as large a variety of recreation activities as may be found appropriate and compatible. The prospective recreationist will be influenced in his selection of the area as a destination by the complexities of recreation interest which can be satisfied. The following developments can be provided:

(1) Campgrounds - trailer sites, family units, group sites, hunting or fishing camps, etc.

(2) Picnic areas - family units, small group, large group.

(3) Organization sites - with a forested atmosphere within reach of the reservoir.

(4) Commercial public service sites - store, filling stations, garages, packer stations, trailer courts, shower and laundry accommodations, marinas, cabin and tent camps, cafeterias, etc.

(5) Swimming sites - should be located on road access and near the marinas.

(6) Boating areas - public launching facilities, zones for water skiing, etc.

(7) Observation sites - near access roads or along proposed scenic drives.

(8) Visitor Information centers - desirable at the largest recreation complexes.

In forecasting the potential recreation use of High Mountain Sheep Reservoir, comparisons were made with existing reservoirs or recreation attractions similarly situated in the general area. Two of these were:

Shasta Lake, Northern California	1,290,000 visits in 1960
Franklin D. Roosevelt Lake, Washington	591,500 visits in 1960

Preliminary estimates indicate this area will attract about 1,160,000 visitor-days of use within five years after creation of the reservoir. This assumes that the dam access road will be connected through to U.S. Highway No. 95, in Idaho, and that a two-lane paved road is completed to Pittsburg Landing from Highway No. 95. A recreation use projection for the Snake River canyon must include the Hells Canyon Dam. The High Mountain Sheep Reservoir and bordering lands will form an integral part of the total attraction that is difficult to evaluate separately. The following projections for the total area are taken from the Forest Service Snake River Recreation Area Plan:

Primary Purpose	% of Use	Peak Day	Season
Sightseeing	51	9,537	591,600
Boating	7	1,309	81,200

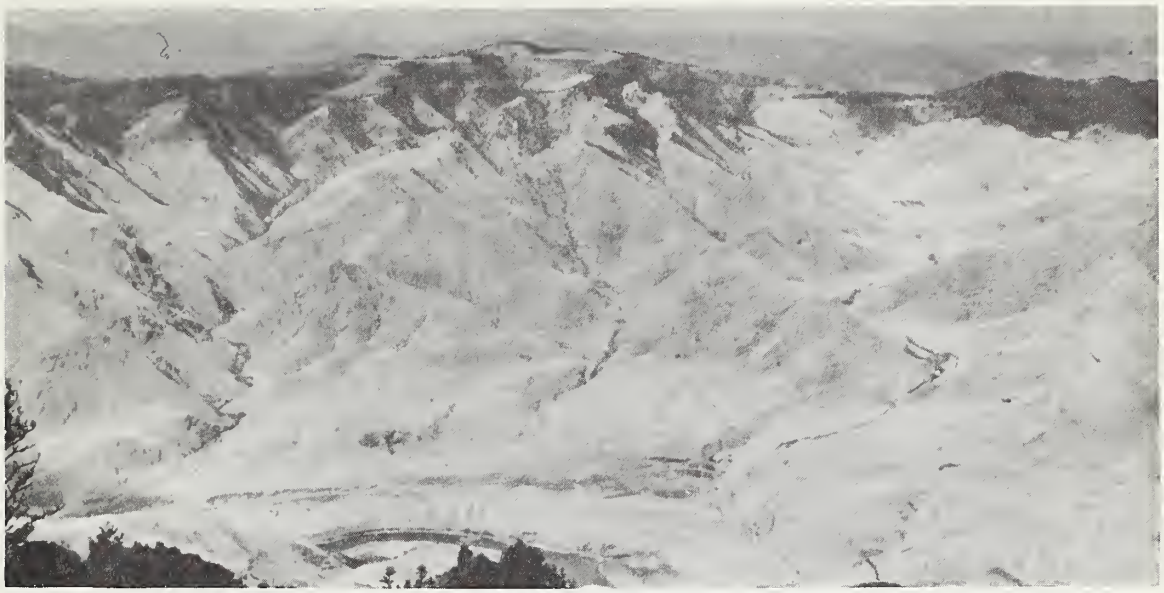
Primary Purpose	% of Use	Peak Day	Season
Camping	26	4,862	301,600
Picnicking	7	1,309	81,200
Hunting and other	9	1,683	104,400
Total (visitor days)		18,700	1,160,000

Assuming that the access road to the dam and Imnaha area will be a through road, while the Pittsburg Landing road will be a dead-end road, it is estimated that 80 percent of recreation use during the early part of the project operation will be on the Oregon side. This use pattern will change when improved access is constructed to the reservoir from the Idaho side. By the year 2000 total recreational use is expected to exceed 2,500,000 visitor-days annually (visitor to the dam and water-oriented recreation visits) if facilities can be designed to accommodate this use on the very limited amount of suitable recreation sites available. An increasing proportion of recreation visitors will utilize Pittsburg Landing, as physical limitations of topography in Oregon limit extensive recreational development along the river.

At Pittsburg there is a large area which may readily be converted to water-oriented recreational use. The only large sandy beaches along the reservoir will be in this area. It is at the mid-point of the reservoir's length and near the center of the roadless portion of the canyon. This site is at the end of the only road access in Idaho to the reservoir, as the dam access road will probably cross into Idaho on a bridge below the dam. Utilization of the full water-oriented recreation potential will require total development of useable lands at this site.

This increased use will dictate the need for acquisition of much of the private lands around the pool area. This acquisition will be necessary not only to provide facilities for public use, but for replacement of big-game habitat, and to protect the aesthetic values connected with the water-oriented recreational use around the pool. The project area cannot be considered alone

POTENTIAL RECREATION SITES



PITTSBURG LANDING

SADDLE CREEK

Large and small recreation sites have been inventoried to meet all types of public recreation needs of the reservoir.

in planning for future recreation use, as other types of recreation and inter-related lands and resources are inseparable.

The licensee should acquire, for public use, private lands along the main recreation access routes in Kurry Creek and west of the Imnaha River. This will guarantee preservation of the high esthetic values along these routes of heaviest recreational travel. They should be purchased in the name of the United States.

Road access to the reservoir must be of a higher standard than without the project in order to serve the anticipated increase in public travel. Many visitors to the project will also wish to see the Hells Canyon-Seven Devils Scenic Area. Those visiting the scenic area may want to see the dam and its appurtenant facilities.

Some launching sites and docks will have to be designed for use at any pool elevation from about 1337 to 1510 feet. This will require construction of launching ramps at least 1300 feet long, unless a better means of boat launching can be devised.

Planned recreation facilities by year 1975 within the planning area are shown in the Snake River Canyon Area Recreation Development Plan.

Better access to the reservoir and increased public use will speed up the requirements for development sites outside the immediate project area. There will be need for observation and overlook sites along the access road and on Summit Ridge in Oregon, and at Pittsburg Saddle and Low Saddle in Idaho. A high standard road from Pittsburg Saddle to Hells Canyon Scenic Area is a part of planned development.

North of the National Forest and east of the Snake River there are limited sites suitable for water oriented recreation use around the pool level. Public land in this area is administered by the Bureau of Land Management and the State of Idaho. To minimize resource conflicts and to promote maximum efficiency in public land administration, management planning should be closely coordinated between all affected agencies. Administration of all public lands adjacent to the pool should be done by one agency.

The application for license shows road access from the town of Imnaha, down the Imnaha River, and over to the dam site. This will be a main access route, and should eventually be connected through to U. S. Highway No. 95 in Idaho in order to facilitate use of the recreation sites available along the way.

Article 48 of the license requires the Licensee to file with the Federal Power Commission a recreation use plan for the project. Within National Forest boundaries the planning, development, and administration of recreation is a responsibility of the Forest Service under Public Law 86-517. Because of the close relationship of other resource values, a comprehensive master recreation plan and estimate of development costs will be made for the entire canyon area by the Forest Service. This plan must consider the needs of all basic resources. In certain areas because of project created resource use conflicts, it may be in the best public interest for recreation to yield to other resources of higher value. A sound recreation plan must define the role of each resource in the overall picture. To this extent it must also be a resource management plan having recreation as its key value. It must, insofar as possible, resolve problems and conflicts caused by the project.

A reconnaissance was made to determine the number and area of potential development sites available around the reservoir and along the probable route of the access road. Detailed surveys will be made of each site in accord with the development schedule in the project recreation plan, preferably before project construction begins. Accurate cost estimates and design of facilities will become of the highest priority. Every useable acre around the reservoir will have to be developed for public use. Most available sites for water-oriented recreation will be used to capacity within approximately 10 years after completion of the project.

Preliminary reconnaissance shows that there are six good potential development sites adjacent to the probable route of the access road from the town of Imnaha to the dam site. These areas vary in size from 54 acres down to two acres. The total area is estimated to be 112 acres. In two additional locations, 133 acres were identified as potential camp or town site and stockpile areas. These project uses can be anticipated, at least on a temporary basis. Some of the area temporarily occupied by the Licensee during project construction can later be converted to recreational use.

This would be most feasible in the case of trailer villages and construction camps.

West of the Snake River, 22 additional sites were identified around the reservoir flow line that appear useable for recreation development. These total 137 acres. It should be noted at this point that this is only about 20 percent of the primary recreation land available along the Imnaha and Snake Rivers in the same area without a reservoir. The quality of the reservoir sites is lower and the cost of development will be much higher in almost every comparable case. (See map following Page 17 .)

There are ten potential campground sites totaling 240 acres within National Forest boundaries along the reservoir flow line east of the Snake River. Six of the campground sites are for boat and trail access only.

A boat-launching site served by the only road access to the upper end of the reservoir will be developed below Hells Canyon Dam near the head of the High Mountain Sheep pool.

Preliminary site inventories, cost estimates, and recommended priorities of development have been tabulated and may be found in the Appendix of this report with a map showing site locations. There are a total of about 490 acres of inventoried recreation development sites within National Forest boundaries adjacent to the reservoir and project access road.

The scarcity of development-type acres will limit the use of the full potential of the pool.

There will be specific problems pertaining to recreation during project construction. Thousands of sightseers will flock to the dam site. Observation points and parking areas will be needed. Sanitary facilities and drinking water must be provided. Responsibility for this provision will be included in the master project recreation plan.

During project construction the boat travel up the Snake River past the dam from the Lewiston area will be eliminated. It will be necessary to improve the access road to Pittsburg Landing at an early date to accommodate the increasing recreation boating traffic. After diversion

of the river at the dam site and until water impoundment is well underway, the only boat access to the reservoir area will be at Pittsburg. The duration of this interval will be about five years. Public demand may require installation of interim facilities at Pittsburg and perhaps also near Dug Bar.

A sharp increase in recreation visits to most other parts of the area is inevitable. It may become necessary to develop planned facilities in addition to those already recommended before completion of the project. The development of the Hells Canyon-Seven Devils Scenic Area should be accelerated. Construction of recreation roads, viewpoints and public facilities along the canyon rims north of the scenic area will become high priority. (Refer to map following Page 17 .)

3. Fish and Wildlife

The recreation potential of the Snake River and lower Imnaha Canyons is directly related to preservation and enhancement of the fish and wildlife resource. This will be true regardless of whether this project is built or who builds it.

The Snake River Canyon supports an unusually high population and variety of fish and game. Mainly, this is due to good habitat. Contributing factors are a favorable climate, inaccessibility, and the scarcity of predators.

Sport fishing knows no closed season on this stretch of the Snake River, yet there is an abundance of fish nearly everywhere. Principal species are the trout; rainbow and steelhead (Salmo gairdneri), and the Dolly Varden (Salvelinus malma); the channel catfish (Ictalurus punctatus) and yellow bullhead (Ictalurus matalis); the sunfish family represented by the smallmouth bass (Micropterus dolomieu) and the black crappie (Pomoxis nigromaculatus); the Chinook salmon (Oncorhynchus tschawytscha); and the white sturgeon (Acipenser transmontanus).

Smallmouth bass so densely populate certain areas of the Snake River that they can be caught on every cast. Consistently small size indicates too many fish for the food supply. The Oregon and Idaho State Game Commissions have responded to the situation by removing the

catch limit in 1964-1965, and instituting an annual limit of two fish on the sturgeon, which seem to be declining.

The Idaho Power Company's dams immediately above this project area are seriously reducing all anadromous fish populations in the Snake River. This is due in part to failure of the fish passage facilities at the dams. Anadromous fish have already been forced practically into extinction in the Snake River's head waters by previous dams and diversions. With the completion of the proposed Hells Canyon dam, the only accessible spawning grounds above the Salmon River will be the Imnaha River and a few other much smaller tributaries.

The reduction of anadromous fish runs in the Snake River adds emphasis to the need to perpetuate or enhance the runs of Chinook Salmon and steelhead in the Salmon and Clearwater Rivers. These two rivers and their head waters are the major sources of the spawning grounds needed to sustain anadromous fish in the Columbia River system for both commercial and sport fishing purposes. Until safe passage of fish over high dams and through large pools can be assured, these two rivers should remain free-flowing.

The Idaho Fish and Game Department, working with the Fish and Wildlife Service and Idaho Power Company has constructed a fish hatchery on Rapid River, a tributary of the Little Salmon River, near the town of Riggins. It is intended that this hatchery will retain the Snake River strain of Chinook Salmon in the Salmon River drainage for eventual reintroduction into the Snake River.

As an integral part of managing the fish resource to meet post-project demands the Forest Service should institute a fish habitat improvement program in streams tributary to the project area. This program must be concerned with both anadromous and resident game fish habitat. The first objectives should be to inventory habitat available now, and that remaining after project completion and determine what action is needed to attain optimum conditions, and as near as possible replace that lost to the project. The Imnaha River drainage will probably be the area of greatest potential, both for game and anadromous fish, providing passage facilities into the Imnaha prove successful.

Sources of water suitable for hatchery use should be located and inventoried in accord with their desirability for this use and other resources involved on the basis of preliminary study. Granite Creek in Idaho may be the best prospect. The construction of artificial impoundments or other facilities may make some tributaries of the Imnaha usable, providing development for this use can be accomplished in harmony with development and use of the recreation, timber, and forage resources.

The technical aspects of this work, the importance of this area, and the resource management conflicts anticipated require that the Forest Service participate in all fish habitat studies related to this project.

Big game animals found in abundance are the Rocky Mountain elk (Cervus canadensis) and the Rocky Mountain mule deer (Odocoileus hemionus). These two species are the objective of nearly all hunters entering the canyons. The following tabulation was obtained from Oregon State Game Department records for 1964 in the Snake River Unit, which lies between the Snake and Imnaha Rivers.

Species	Hunters	Kill	% Success
Elk	701	324	46
Deer	1,233	761	62

The percent of hunter success for elk was among the highest of all units in Oregon.

As grasses replace forbs in the canyons, deer numbers are going down somewhat on the Oregon side and it is believed they will reach stability with the habitat capacity. About 17,000 acres, mostly winter range were burned in 1960, with some destruction of browse plants. Many dead deer were observed in the vicinity of the larger burns during the two-three years following the burn. This is attributed to the temporary reduction in the carrying capacity of these areas.

Better hunter access would help control overpopulation, and result in harvest of many deer which are presently dying of natural causes. Predation is a negligible factor in big-game management. Coyote and bobcat are vigorously controlled to facilitate the "open herding" of sheep. Cougar have been virtually extinct for about

LAND RESOURCE VALUES
FISH AND WILDLIFE

The top picture illustrates key game range to be flooded. The lower picture shows typical private lands which will have to serve as replacement of this winter game range.

20 years. Eagles take a number of fawns and lambs each spring.

Mule deer is the predominant big game species inhabiting the lower slopes of Hells Canyon. A few whitetail deer use the brushy creek bottoms leading into the canyon in Idaho. The quality of the mule deer is generally poor in the herd that exists along the river. This is probably due to an overcrowded range that lacks necessary browse plants. On the Idaho side 5,600 acres, mostly winter range, was burned in 1960 with destruction of browse plants; hunter harvest is inadequate. Undoubtedly, deer use conflicts with the grazing of domestic sheep.

No formal estimate of population numbers is available, but it is generally known that the mule deer population is high. The heaviest concentrations are in the upper reaches of the canyon. The end of navigation is at Sheep Creek, and an insignificant number of animals are harvested above this point.

On the Idaho side a few elk inhabit the Salmon-Snake River Divide and may venture out on the higher ridges overlooking the canyon, but are of little significance.

There are indications of a steadily increasing elk population on the Oregon side, estimated by the State Game Commission to total 4,400 at present in the lower Imnaha-Snake River Canyon area, and to be nine times the number wintering in this area in 1957. This may be due in part to growing hunting pressure in the more accessible areas to the west. Ultimately, this trend will result in these animals over-running their high altitude summer range, with consequent longer and more intensive use of areas at lower elevations. Conflicts with livestock use are inevitable. The solution apparently is to decide on the approximate optimum number of elk for the habitat, based on field studies and forage utilization checks. The cooperation of the State Game Commission and Sportsmen's groups should be obtained so that population controls can be readily put into effect when needed. These would consist of methods approved by the Game Commission, as special hunts or issuance of additional tags. Better road access is not, in this case, a complete answer since many of the roads that might be built would be closed by snow during elk season. Protection of the full value of

other resources dictates that many canyon areas should not be disturbed by access roads. More and better trails would be a great help.

Black bear (Euarctos americanus) are found generally in the brushy bottoms and timbered upper basins of the side drainages. They are widely distributed but are not common. In Idaho they are a game animal but in Oregon they are not considered as such, and thus are not protected. A few are killed incidentally by deer and elk hunters. Their number do not make them a significant game animal in the area.

Early settlers report that the canyon and adjacent mountain areas were once populated by Rocky Mountain Bighorn sheep (Ovis canadensis). With the readjustment in numbers of range sheep since the early part of the century, efforts should be directed to re-establish the Bighorn, considered by some experts to be the top North American trophy animal.

The Snake River canyon has a high capacity for production of upland game birds. The Chukar partridge (Alectoris groeca) introduced from northern India, ranges in season from top to bottom of the canyons. The population and range has steadily increased since their establishment. Flocks of 40 to 50 are commonly found in the upper canyon between Johnson Bar and Saddle Creek. Hungarian partridge (Perdix perdix), mountain quail (Oreortyx picta), ruffed grouse (Bonasa umbellus), and blue grouse (Dendragapus obscurus), are found in lesser concentrations. However, the ridge tops in the north end of Wallowa County are generally acknowledged to provide the best blue grouse hunting in Oregon. Upland birds are hunted lightly along roads, ridge tops, and a few localized areas along the Snake River. The rugged terrain has so far discouraged most hunters.

Certain areas of the canyon provide habitat suitable for nesting of migratory waterfowl. These are generally in the vicinity of canyon bottom alfalfa fields. Most notable of these is near the Temperance Creek Ranch, where up to 100 Canada geese have been observed nesting in the rim on the Idaho side. Nearly all known brood areas will be inundated around the reservoir.

Many ducks and geese are observed resting and feeding during migration periods, although this area is not on a major

flyway. The gravel bars, shallow feeding areas, and shore line coves will be inundated by this reservoir. Hunting of migratory waterfowl in the project area is not significant at this time.

Cottontail rabbits (Sylvilagus nuttallii) are occasionally observed and there are a few snowshoe rabbits or varying hares (Lepus americanus) in timbered areas. Small game is almost never hunted in the canyons.

Furbearers found along the rivers consist mainly of raccoons (Procyon lotor), otter (Lutra canadensis), beaver (Castor canadensis), muskrat (Ondatra Zibethicus), bobcat (Lynx rufus), badger (Taxidea Taxus), coyote (Canis latrans), mink (Mustela vison), and skunk (Mephitis mephitis) are also present. Trapping activity has been almost non-existent for at least six years, due mainly to lack of demand for this type of fur.

Indications point to a continued declining trend of the range livestock industry, particularly sheep. A land acquisition program should be implemented to acquire for recreation and wildlife habitat some of the canyon lands now privately held. Any grazing preferences waived to the Forest Service will be examined to include game habitat needs before reissue.

There are some fish and wildlife problems which exist or would eventually exist regardless of whether this reservoir was constructed. Others which may be regarded as project impacts are briefly listed below. They are further discussed in the text of this section.

a. The fish passage problem over high dams or through storage reservoirs without water current has not been solved.

   There would be probable loss of use of the spawning area of the Imnaha River and other tributaries to the project area.

b. There will be an alteration in composition of the fish population, with loss of anadromous and desirable resident species and increase of trash fish.

c. Easy game travel routes on bars and benches along the river would be lost.

d. Some feed areas would be isolated by reservoir arms and rim rocks, preventing their use by game animals.

e. There would be a problem of compensating for big and small game habitat lost in the pool.

f. Adequate trail access for hunters from reservoir boat landings to hunting areas would be needed.

g. Upland game birds would lose the lower cheatgrass benches and bars which provide a major nesting and feeding area.

h. Waterfowl habitat would be affected adversely.

With construction of the proposed reservoir there would be drastic alteration of the present habitat. Some species would be unable to adapt their life cycle to the new conditions. Upstream projects have proven that modern technology is not equal to the task of passing anadromous fish over much lower dams. This means the end of the Chinook salmon, the steelhead, and very likely the sturgeon in this stretch of river. The small-mouth bass could probably survive in greatly reduced numbers in the more shallow water at the head of the reservoir. Conditions would especially favor trash fish such as carp, suckers, and the Columbia River squawfish. Rainbow trout could probably maintain their present numbers if they could find their way up the small tributary streams to spawn.

It is questionable that a good resident fishery could be established in a deep, narrow, shoestring reservoir with few shallow feeding or spawning areas. The potential recreation value of this reservoir depends to a considerable extent on the quality of sport fishing available. Brownlee Reservoir has a similar surface acreage and is somewhat comparable. Brownlee does not, however, receive its inflow through a chain of three continuous impoundments, as would High Mountain Sheep. Because of deoxidation and temperature stratification of the water in Brownlee, fishery values have

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FOREST SERVICE
E.P. CLIFF, CHIEF

WALLOWA—WHITMAN (MINAM DIVISION)—NEZPERCE
& PAYETTE NATIONAL FOREST

HIGH MOUNTAIN SHEEP OAM & RESERVOIR IMPACT AREA

1964

Scale
0 ½ 1 2 3 4 5 6 Miles

LEGEND

- NATIONAL FOREST BOUNDARY
- PAVED ROAD
- ALL WEATHER ROAD
- DIRT ROAD
- PRIMITIVE ROAD
- TRAIL
- HELLS CANYON-SEVEN DEVILS SCENIC AREA
- PROPOSED ROAD
- BIG GAME WINTER RANGE BOUNDARY

BIG GAME WINTER RANGE

117°00'
WASHINGTON
OREGON
IDAHO
SNAKE
PROPOSED HIGH MTN SHEEP DAM
OREGON
R. 1 E.
T. 28 N.
R. 1 W.
BOISE MERIDIAN
T27N
T26N
T25N
T24N
T23N
T22N
R47E
R48E
R49E
R50E
R51E
HELLS CANYON - SEVEN DEVILS
PAYETTE NATIONAL FOREST
SCENIC AREA
WALLOWA BASIN

recently declined. This is also related to pollution of the inflow by agricultural and manufacturing waste from upstream areas.

Reservoir data shows that at full pool, Brownlee Reservoir has about 2.45 times as much surface area per unit of storage capacity as High Mountain Sheep would have. Brownlee has a maximum drawdown of only 101 vertical feet, yet it has only become well known for production of certain members of the perch and sunfish family.

The High Mountain Sheep reservoir would inundate about 17,200 acres. Of this total, about 11,160 acres is within National Forest boundaries and is also included in the 19 grazing allotments which will lose some area to the reservoir. The livestock carrying capacity of the private and Federal land to be lost by flooding or rendered unusable within the canyon is estimated under present conditions to be 555 cow-months plus 37,017 sheep-months of use. Large areas of most allotments are unusable by livestock, particularly cattle, because they are excessively rocky or steep. (Usable acres of forage lost is listed in Table 5B, Page 89.)
Game animals are more agile than livestock, hence are not as restricted by topography in the use of feed areas. The actual loss of wildlife habitat would therefore exceed the loss of livestock forage values as a percentage of the carrying capacity to be inundated.

The value of the wildlife habitat is being determined by a current Forest Service, States, and Fish and Wildlife Service study. A large yearlong population of deer has been observed along the rivers and in the mouths of major side drainages. These animals would be displaced to a higher elevation where a new balance between population and available habitat must be achieved.

Elk use within the reservoir area is not intensive except during the occasional severe winter when the lower elevations may become the key to survival. With the trend toward buildup of elk herds in the Oregon side of the canyon area, it is difficult to predict what the future use pattern will be, or what areas will become critical at various seasons. The impact of the loss of critical winter range is of prime concern in future management of the area and will result in adjustment of management practices above the flowage line. (See map following page 35.)

The partridges and quail will be adversely affected by inundation of the lower benches. Biologists report that the staple food of the Chukar for a good part of the year is the seeds and leaves of annual grasses. These are found extensively along the river on bars and benches where the ecological cycle of plant succession was set back by overgrazing and fires in the era of the homesteader. The same areas are used for nesting and brooding.

Because of the extreme drawdown, it is unlikely that shoreline vegetation will develop naturally to reestablish the habitat of fur bearers or migratory waterfowl. The possibility for direct habitat improvement within the drawdown area on the more favorable sites should be investigated. Hunter access will be complicated by the drawdown, which would normally be under way by hunting season. The proposed shoreline trail will be constructed in steep, rocky terrain in most places, with few good boat landings or moorages. Since hunters can step ashore on any sandbar today, without fear of more than a few feet of daily water fluctuation, it is difficult to predict how much this reservoir will improve hunter access.

There is no seasonal migration of game animals across the Snake or Imnaha Rivers in the areas to be inundated. Undoubtedly some animals do cross, but not as a necessary part of their life cycle. Ample low elevation wintering areas exist on both sides of the Imnaha and Snake Rivers. These will be lost to the reservoir. In the event of unusually heavy winter snows, some animals might be unable to cross the Imnaha arm of the reservoir as they seek the remaining low elevation areas at Salmon Bar or other low flats below the dam. In extremely cold weather parts of the reservoir may freeze over and deer fall through the ice and drown in attempting to cross. If any structures such as fish canals are built which may be hazardous to wildlife, they should be covered or screened by a game-proof fence and adequate, safe crossings provided.

The Forest Service, in accord with the Fish and Wildlife Coordination Act of March 10, 1934, (48 Stat. 401, as amended), is responsible for management of wildlife habitat on National Forest lands. Because of this responsibility, the impact of the project on this resource becomes particularly significant.

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WALLOWA-WHITMAN (MINAM DIVISION)—NEZPERCE
& PAYETTE NATIONAL FOREST

HIGH MOUNTAIN SHEEP DAM & RESERVOIR IMPACT AREA

1964

Scale
0 ½ 1 2 3 4 5 6 Miles

LEGEND

- NATIONAL FOREST BOUNDARY
- PAVED ROAD
- ALL WEATHER ROAD
- DIRT ROAD
- PRIMITIVE ROAD
- TRAIL
- HELLS CANYON-SEVEN DEVILS SCENIC AREA
- PROPOSED ROAD

GRAZING ALLOTMENT

117°00'
WASHINGTON
OREGON
IDAHO
SNAKE
PROPOSED HIGH MTN SHEEP DAM
CHERRY CR.
S&G
LONE PINE
C&H
TOMMEY
LOWER
TULLEY CR.
C&H
C&H
COW CR
C&H
DEEP CR
S&G
ROLAND CR.
C&H
ROLAND CR.
C&H
CAT CR
S&G
DOOSON
HAAS
COW CR
C&H
TRYON CR
C&H
BIG CANYON
S&G
LOG CR
C&H
C&H
LORD FLAT
C&H
PITTSBURG
IMNAHA
LIGHTNING CREEK
C&H
PITTSBURG
C&H
SOMERS
S&G
CAYUSE
C&H
MORMON SLEEPY
S&G
KIRKWOOD
S&G
BALD KNOB
S&G
TEMPERANCE CR
MONUMENT RIDGE
F.S. HORSE PASTURE
SNAKE
RIVER
OREGON
GRANITE SHEEP CREEK
S&G
S&G
SADDLE CR
C&H
HIMMELWRIGHT
C&H
HELLS CANYON
SEVEN DEVILS
PAYETTE
NATIONAL
FOREST
SCENIC
AREA
SNAKE
RIVER
C&H
NATIONAL
RIVER
WALLOWA
BAKER
R. 1 E.
T. 28 N.
R. 1 W.
BOISE MERIDIAN
T27N
T26N
T25N
T24N
T23N
T22N
R47E
R48E
R49E
R50E
T6N
T5N
T4N
T3N
T2N
T1N
T5S
T6S

At first glance it would appear that the relatively narrow pool created by the project would have little adverse effect on the resident wildlife populations. However, any one familiar with the use patterns of these populations, especially deer and elk, will immediately realize that this is not true. The slopes of both the Snake River and Imnaha River drainages are used as winter range from about the 4000-foot level to the river's edge. During mild winters the animals would have no difficulty sustaining themselves on lands above the proposed pool at existing population levels. During more severe winters, which usually occur once in every five or six years, heavy snows on the steep slopes literally force the animals down to the river bars and more level benches along the rivers. These lands (some 15,000 acres) then become critical for survival, and these are the lands that lie within the proposed flowage area.

It must first be recognized that nothing can be done to fully offset the loss of this critical range with respect to the wildlife in the canyons. Partial mitigation is possible by improving habitat conditions just above the proposed flowage lines and the areas where this improvement can be most effective is now in private ownership.

The licensee should purchase such lands and assign them to the United States to be managed by the Forest Service primiarily for wildlife habitat values, so much of the existing populations could be saved.

The Forest Service is now conducting a study in cooperation with the State agencies involved to determine the amount and location of lands needed. Immediately after completion of this study the licensee should start acquisition of these lands to insure their availability by the time the pool is filled. Habitat improvement, by the Forest Service, should start as soon as these sites, and any others, are available and funds are programmed.

Some 1300 acres of land will be removed from use by wildlife outside the pool area because of access road construction and use of land for project construction and project works. The loss from these lands should be mitigated on the basis of the use they provide.

LAND RESOURCE VALUES
RANGE

(The Heart of Hell's Canyon)

Much available forage in the limited bottomlands as illustrated in these photos will be lost by inundation.

Some of the most desirable replacement areas in Oregon are the privately owned lands east of the Imnaha arm. If these private lands can be acquired by the United States, it would be desirable to confine roads, major recreational and administrative areas, etc., to the west side in order to achieve the maximum enhancement of wildlife habitat and wilderness-type recreation of the peninsula that will be formed between the Snake and Imnaha arms of the reservoir. Private lands needed for replacement in Idaho are the scattered tracts close to the reservoir upstream from Pittsburg Landing. Specific tracts and total acreage have yet to be determined.

During the construction period unrestricted fish passage should be assured and disturbance of the natural streambed held to a minimum. Gravel should not be removed from river bars nor should aggregates be washed in streams or other undue sedimentation caused. In clearing operations, care should be taken to avoid destruction of wildlife habitat above the flow line by indiscriminate use of machines, escaping slash fires or other means.

Fish canals, ladders, or other passage facilities should be approved by the State and Federal agencies concerned before and after installation. This should apply also to temporary facilities used during dam construction.

If the replacement Snake River trail is not completed until after filling of the reservoir, there will be a critical period during which some feed areas may be inaccessible to game animals. Rims and reservoir arms may form barriers to travel. This situation may exist to some extent even after the trail is replaced. Construction of livestock access trails recommended in the Range section of this report will also be of some use to game animals in making the habitat more fully available.

Wildlife on lands within the Payette National Forest will not be adversely affected since the small area inundated has low productivity as game range.

4. Range

The proposed dam and reservoir would occupy portions of 19 different grazing allotments. Of these, 15 are on

the Wallowa National Forest in Oregon and four on the Nezperce in Idaho. These allotments are used in the fall, winter, and spring. No allotments are used between June 30 and October 1. Most are vacated earlier and re-entered later. Nearly all the livestock wintering on these 19 allotments summer on National Forest land. Therefore, changes directly affecting these winter allotments also have an indirect effect on some summer allotments. In cases, this effect is intensified by the fact that nine home ranches would be inundated on the winter allotments.

In Oregon, competition between big game and domestic livestock for available forage is increasing due, in part, to the build-up of elk herds. Range studies indicate an adjustment of animal numbers is necessary on some allotments.

The Snake and adjacent Imnaha area form the longest continuous grassland in Region 6 of the Forest Service. The various species of native bunchgrasses have proven to be the most desirable and productive. Past experience has indicated that management should be directed toward perpetuating the native perennial bunchgrasses rather than annuals.

The increase in elk population and accompanying increase in demand upon the available forage indicates a study should be made of available summer range to determine productive capacity under optimum management of all resources involved. On the Idaho side, summer range is extremely limited, and available range must support year-round deer populations. There are presently one cow and three sheep allotments within the area affected by this project. These are winter allotments and are dependent upon the feeding grounds and hay meadows in private ownership on the floor of the canyon.

Allotment analysis plans call for the correlation of the domestic livestock and big-game use with the soil and water resource values. In some instances this will require improvement in current management practices and may necessitate downward adjustment in present stocking.

Objectives are as follows for both sides of the river:

PRIVATE LANDOWNERSHIP

Somers Creek Ranch shown in the upper photograph was one of the first homesteads in this area. This and the Dug Bar Ranch shown below illustrates the complex land pattern adjacent to the Snake River.

a. To determine management programs to achieve optimum productive capacity as quickly as possible.

b. To determine the impact of continued big-game population increase on the summer range.

c. To identify the relative levels of big-game, livestock, timber production, and other uses which can be considered compatible with the available resource base.

d. To set up a "barometer" warning system to indicate the imminence of big-game overuse in time to institute effective population controls and forestall habitat damage.

Because of topographic difference (bench land is scarce on the Idaho side) flooding of prime winter range will have a different impact upon total game populations and domestic livestock use on each side of the river.

Since the two sides of the canyon are separated into different geographical areas, and are not related by intermingled livestock operations, their range resource impacts are discussed separately in this report.

Construction of the project will have a varying effect on the domestic livestock operations which adjoin the reservoir. These impacts are discussed by individual allotments in the appendix to this report.

No domestic livestock range would be affected on the Payette National Forest.

Permittees have purchased all the old homesteads and patented mining claims within their allotments. The uncultivated parts of these lands are waived for private land grazing permits. Generally they are the flattest and potentially the most productive portions of the allotments. While many are making a fair vegetative return, range condition is not satisfactory.

In isolated cases due to lack of vegetative cover there is evidence of accelerated erosion. Public needs created by the project will require that these lands should be inventoried for their relative value to each resource

use and priority assigned for acquisition, restoration of suitable ground cover, and development.

Adjustments in National Forest management plans can be facilitated by cooperation of the licensee before and during the construction phase. These would include, but not necessarily be limited to the following provisions:

a. There should be replacement of watering facilities for livestock and game to a level at least corresponding to that available before the project. These should be readily accessible in the areas where needed. Particularly, such areas would be around fish canals, access roads, steep unstable slopes and other barriers which would restrict the travel of large animals. One of the purposes of these facilities would be to minimize hazards or "trap" situations caused by the project which would induce animals to enter areas where they would be subjected to abnormal risk in trying to obtain water.

b. The existing transportation system should be replaced to provide the same accessibility as before the project. This will be complicated by the fact that the best existing route for livestock travel is often along the lower benches and bars that will be inundated by the reservoir.

   Loss of these travel routes must be offset by construction of trails or driveways in addition to mere replacement of existing improvements. There must be provision for stock to reach all existing feed areas and for travel around or across the arms of the reservoir.

c. The licensee should replace or construct fences adequate to restore the necessary control over livestock movement.

d. Project-created hazards to game or livestock should be fenced to exclude both. Where passageways are necessary for the unrestricted movement of animals around or across these areas, the licensee should provide them.

To provide continued adequate utilization of the forage resource it is desirable to continue grazing these allotments wherever it is compatible with other resources. Under certain conditions livestock grazing and companion game use may be mutually beneficial. Management programs must be carefully studied after each season's use to arrive at optimum forage production. The proper proportion of use by each type of animal must be determined and then maintained by established control procedures.

Appended to this report is a discussion of the impact of the project on each individual allotment from available project data and the best current knowledge of the allotment and the livestock operation. Statistical data on loss of forage production values is contained in Table No. 5B and Table No. 5C.

The discussion is limited to more or less intangible losses, problems which will occur due to the project, and recommendations of the Forest Service. In some cases the statement had been made that no problems of livestock movement will be caused by the project. This refers to movement to and from markets or summer ranges. Movement within the allotments will be contingent upon replacement of the existing road and trail system to a standard which will furnish service at least equal to that existing before the project.

There will be many specific problems pertaining to management of the range resource during project construction. Action on acquisition and disposition of private lands should commence as quickly as possible. The desirability of maintaining livestock use wherever practical has already been pointed out. Forest Service planning should be done far in advance so that the transition period to post-project operation will be smooth and short.

Replacement of the shoreline trail system should be accomplished prior to inundation to prevent problems of stock movement to all usable range areas. A barge service will be necessary to transport livestock across the Imnaha Arm if grazing is continued. Some stock driveways may have to be constructed.

Existing drift fences and allotment boundary fences should be replaced with galvanized steel posts. This will require some relocation to take advantage of natural barriers and to prevent livestock intermingling during periods of drawdown. Fences will also be necessary around portions of the reservoir shoreline and developed areas to prevent unrestricted use. Roads constructed through grazing lands should be accessible to livestock unless they are fenced for stock exclusion. It will be necessary to design stock access routes to the road at appropriate intervals.

5. Timber

The timber resource within and immediately adjacent to the proposed project boundary is of minor commercial importance. Its primary value is aesthetic and for protection of the watershed. The lower slopes of the canyon are grasslands with some brush and tree growth in the bottom of draws and along stream courses. Very little commercial forest is found below 4,000 feet except for an occasional sparse stand on the north exposures. Extensive commercial forest stands composed largely of lodgepole pine, ponderosa pine, white fir, and Douglas-fir are found at elevations above 4,000 feet.

Past timber harvest within the canyon area has been limited to local use by homesteaders and miners. It is very insignificant. Fire has had considerable influence on characteristics of the forested areas, with considerable timbered acreage being burned over as late as 1960. Dense even-aged stands in certain localities in the south end of the canyon undoubtedly sprang up after severe early-day burns. The field inventory of the timber resources on National Forest land was completed in the 1950's with the timber management plans for the period through 1970 being completed and approved by 1963. The Snake River Limited Area west of the river was considered to be an area temporarily reserved from timber harvest. No permanent inventory plots were established within the limited area, but volumes were computed using type acreages and average volume per acre for the working circle as determined from plots.

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HIGH MOUNTAIN SHEEP DAM & RESERVOIR IMPACT AREA

1964

Scale
0 ½ 1 2 3 4 5 6 Miles

LEGEND

- NATIONAL FOREST BOUNDARY
- PAVED ROAD
- ALL WEATHER ROAD
- DIRT ROAD
- PRIMITIVE ROAD
- TRAIL
- HELLS CANYON-SEVEN DEVILS SCENIC AREA
- PROPOSED ROAD
- SNAKE RIVER LIMITED AREA BOUNDARY

SNAKE RIVER LIMITED AREA

117°00'
WASHINGTON
OREGON
T6N
T5N
T4N
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T2N
T2S
T3S
T4S
T5S
IDAHO
SNAKE
SNAKE RIVER
LIMITED
AREA
PROPOSED HIGH MTN SHEEP DAM
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LIMITED
AREA
R47E
R48E
R49E
R50E
R51E
R. 1 E.
T. 28 N.
R. 1 W.
BOISE MERIDIAN
27N
T26N
T25N
T24N
T23N
T22N
OREGON
HELLS CANYON - SEVEN DEVILS
NATIONAL
PAYETTE
FOREST
SCENIC
AREA
R. 1 E.

The area contains 394.4 MM board feet of merchantable timber, mostly in the upper basins of drainages tributary to the proposed reservoir on both the Imnaha and Snake River sides of Summit Ridge. These are Horse, Lightning, and Cow Creeks on the Imnaha side, and Deep, Somers, and Temperance Creeks on the Snake River side. The upper basin of Temperance Creek contains a stagnated stand of mostly overmature conifers.

On June 6, 1962, the Secretary of Agriculture established the Hells Canyon-Seven Devils Scenic Area which overlapped the south end of the Snake River Limited Area. The Scenic Area Management Plan provides for carefully designed timber harvesting in those areas comprised primarily of commercial forest. The largest stand of timber within the Scenic Area and tributary to the proposed reservoir is on the south side and upper basin of Saddle Creek. About 5,000 acres in area, this is a dense, young, thrifty stand of conifers. Other timbered areas are the south side of Battle Creek and the upper basin of Stud Creek.

If no reservoir were constructed, future management would follow guidelines set forth in the approved Timber Management Plans. These plans do not show timber in either the Limited Area or Scenic Area as presently available for commercial cutting. Page 10 of the Scenic Area Management Plan outlines specific practices for timber harvest in the Scenic Area. At the next scheduled revision of the Timber Management Plans, the timber management needs of both areas will be re-examined.

Existing timber management plans should need only minor adjustment following completion of the proposed project. A small area of noncommercial timber land will be inundated in the Imnaha Arm of the reservoir. The aesthetic value of the timber on the upper slopes around the reservoir can best be appreciated from roads and viewpoints on the rims and the ridges. These are planned for construction regardless of whether a reservoir is built. Any planned future timber harvest will be designed to preserve recreation values that now exist.

Minor timber resource management problems will occur during project construction. Marketing of forest products to be removed by the reservoir clearing deserves consideration. The timber of merchantable size is widely

LAND RESOURCE VALUES
TIMBER

This picture illustrates trees are not plentiful in the lower elevations. Also it is interesting to note there is 8000 feet difference in elevation from the river to the peaks.

scattered throughout the reservoir area. It is nearly all deciduous; mostly white alder (Alnus rhombifolia). There are a few large introduced shade or nut trees and some conifers occurring singly or in small groups. A photogrammetric cruise was made to obtain a rough volume estimate. Tree crowns were counted and average tree volume estimated to be 180-board feet for trees of merchantable size. No field checks were made. Compilation of the cruise shows the following:

Snake River:

500 trees on	47 acres	National Forest	90,000 bd.ft.
288 trees on	20 acres	Private Land	52,000 bd.ft.
	67 acres		142,000 bd.ft.

Imnaha River:

160 trees on	13 acres	National Forest	29,000 bd.ft.
440 trees on	23 acres	Private Land	79,000 bd.ft.
	36 acres		108,000 bd.ft.

Total National Forest	60 acres	119,000 bd.ft.
Total Private Land	43 acres	131,000 bd.ft.
	103 acres	250,000 bd.ft.

There is no local demand either in the Enterprise or Lewiston area for the predominant species of deciduous timber. Only that located in the Imnaha River drainage is accessible by road. There will be a minimum of five years available for disposing of the timber within the reservoir area.

Logs which cannot be sold and removed even after the reservoir is filled should be disposed of by burning.

The situation east of the Snake River is generally similar in that no commercially productive timber lands are within the project boundaries. There are, however, approximately 25,000 acres of commercial forest lands on the slopes above the project area. This acreage supports about 350 MM board feet of merchantable size timber mostly ponderosa pine and Douglas-fir, plus additional stands of young growth. Timber harvest on the Snake River side

of the divide has been very light to date, but a major harvest program is planned in Kirkwood Creek within five years. It is anticipated that much of the 25,000 acres will receive its first cut within the next 20 to 30 years. Harvest will be done by conventional methods involving construction of necessary access roads.

A large additional acreage of forest has been deferred from harvest by presently available methods because of steep slopes and the risk of excessive soil disturbance. This area will not be placed under intensive management until development of helicopters or other machines and harvest methods permitting intensive management without damage to the soil and aesthetic resources.

Project development will influence timber harvest east of the reservoir. Higher quality access roads will reduce hauling costs. On the other hand, harvesting methods must be designed to maintain a pleasing foreground from viewpoints, major access roads, and the reservoir. Vastly increased public use will accentuate recreational and scenic values at some sacrifice in the production of raw material for the wood-using industries. This impact differs from that west of the river where the main reservoir access will be through nontimbered areas.

There is a commercial quantity of cascara buckthorn (Rhamnus purshiana) in many side draws tributary to the project area. The bark of this shrub or small tree has had, for many years, a commercial market as a result of its medicinal qualities. This market may still exist in coastal areas, but no evidence of gathering of this minor forest product has been found in the project area. The possibility of salvaging this material within the reservoir clearing area should be explored.

Problems to be anticipated during construction of the project would be those involved with removal of any forest product found merchantable. No appreciable amount of road construction would be justified for the small values involved and it is believed that products would be removed by existing roads or by water.

Loss of existing commercial forest values or potential productive capacity to the project under present market conditions is negligible. It is likely that construction

of the project access road to two-lane standard will increase the value of the forest products made accessible. Management of these stands in relation to the project will be modified as necessary to recognize scenic and aesthetic values. This in turn will require intensified insect and disease detection and treatment.

6. Land Use

There are 22 special-use permits in effect within the project area. These may be terminated or revised as necessary when project construction begins. A number of other permits may be affected by disposition of the various grazing allotments. None of these are charge permits and they could be terminated if use of the allotment ceases.

Permits for land use which is partly or completely within the project area are listed in Table 8 of the Appendix.

Idaho Power Company, under terms of License No. 1971 issued by the Federal Power Commission , constructed a 230-kv transmission line down the west side of the Imnaha River. This line crosses the Imnaha and the Snake River just west and north of Cactus Mountain. The lines in the project area are well above the proposed flow line. Some towers may require relocation to permit construction of the project access road. The project access road on the west side of the Imnaha River between Little Basin Creek and Toomey Gulch will probably follow the approximate route of the road built by Idaho Power Company for construction and maintenance of this transmission line.

Since most of the special uses are associated with range use, it is planned to retain them as long as they are desirable in that connection. The commercial campsite at Pine Bar near the mouth of Willow Creek is permitted on a year-to-year basis and will be terminated when the site is needed to serve the general public.

Construction of the project will eliminate the special-use permits within the reservoir area. The permits associated with the grazing use on the George Wilson sheep

allotments will be terminated along with the grazing permit. (See Appendix.) No problems in termination of existing permits are anticipated. Reimbursement by the Government will not be required. The access road permitted Dave and Bruce Walters to their sheep operation will be replaced by a higher standard road under the existing transportation system development plan.

Land Use Associated with the Project

Commercial public service special-use areas will be needed at Kurry Creek to serve the public needs. The facility at Kurry Creek (Pittsburg Landing) may include a motel, store, and service station, with boating service facilities. As explained in the Recreation Section of this report, this development will be needed during project construction.

No mineral deposits of known economic significance will be inundated by the proposed High Mountain Sheep Reservoir. The reservoir will provide easier access to areas adjoining the reservoir pool and may encourage more detailed exploration of known mineralized areas.

Construction of access roads, operator villages, stockpile areas, construction camps, etc., outside the project area on National Forest land will be covered by special-use permit. Location and design of these developments should precede issuance of permit to avoid conflict with recreation and other resources. The permits should contain clauses to insure restoration of these sites to original condition if use is temporary or conversion of particular facilities for public use where applicable.

Occupancy of National Forest lands and use of nonproject roads maintained by the Forest Service should be put under special-use permit when necessary for engineering, fisheries, and wildlife studies and all other uses connected with the project.

B. Forest Administration and Protection

1. Transportation Systems

a. Forest Roads

West of the Snake River - Development of the planned National Forest road system has not been completed around the area of the proposed project. Most roads are either not built to the ultimate standard or do not as yet exist. See the planned improvement map and Table No. 1 for current status.

Planned development of the road system by the year 2000 would include completion to ultimate standard of all existing and proposed roads shown on the Transportation System Map. A preliminary photo reconnaissance has shown that it is feasible to connect the proposed Road N-206 with the existing Dug Bar Road N-422 via Fingerboard Saddle and Little Deep Creek. A spur could then be built to Snake River at the mouth of Somers Creek via Tryon Saddle. These roads will probably be added to the Transportation System if no reservoir is built. They are needed to provide late fall access for elk hunters to the area surrounding the north end of Summit Ridge, a key development in securing adequate hunter harvest of elk under present access conditions. These roads would be built to SL-12 standard with 60-foot minimum radius curves and grades not over 10 percent.

For reasons already explained in other sections of this report it is desirable and practical to build roads in only a few portions of the canyon. The construction time-table would, however, be speeded up to accommodate project-attracted use.

It will be undesirable to replace the Dug Bar Road N-422 east of the Imnaha Arm of the reservoir if all private lands in this area can be acquired by the United States. A shoreline trail would adequately serve transportation needs in this area if private land access was no longer a factor.

An eventual road may be needed to the north end of Summit Ridge if improved water access created

by the reservoir does not result in adequate elk harvest. This road could come in from several directions, depending upon need as shown by reservoir use.

East of the Snake River - The only access to Snake River is via Forest Road No. 493 down Kurry Creek to Pittsburg Landing. Originally a wagon road, most of this road does not meet present Forest Service minimum standards. Use consists of ranch, timber, administrative, and recreational traffic. Transportation planning calls for primary access to the Snake River down Kurry Creek, and a major all-purpose road along the Snake River-Salmon River divide (Seven Devils Road No. 420). Complete relocation and/or reconstruction of the existing sections of these roads to a DN-26 standard is planned for the future.

Timber harvesting will require a main access road into the Sheep Creek drainage. The possibility of a second access to the Snake River from this system is under study. In addition to the river access roads, a major all-purpose road is planned from Pittsburg Saddle to Heaven's Gate. This is Seven Devils Road No. 420 and is partially existent. Portions of the new construction and reconstruction will be done in conjunction with the timber harvest program. The major cost of bringing this road to all-purpose standard will be from appropriated funds. In addition to being very scenic, the road will provide access directly from the Hells Canyon-Seven Devils Scenic Area via the Kurry Creek route to the Snake River.

The only present access to the north boundary of Nezperce National Forest in this area is over a special-use road from Pittsburg Landing. Constructed and maintained by Dave and Bruce Walters, this road is barely adequate for jeep travel. Future plans without the project call for construction of a replacement road to SL-14 standards.

Timber harvest will result in construction of access roads in addition to the all purpose roads previously discussed.

Revision of the transportation system required by project construction would be mainly to higher standards required to accommodate project created increased public use. Public use will require that the Kurry Creek and Seven Devils roads ultimately be built to a two-lane paved (DN-26) standard.

The present Kurry Creek road is not adequate to accommodate additional use. A heavy influx of traffic, pulling large boats and trailers, is expected when the river is closed to upstream travel at the dam site. Some betterment work will be required to handle this traffic prior to the time that an adequate standard road to handle project created traffic is completed by the licensee. If the licensee uses this access for reservoir clearing equipment and crews, it may have to do betterment work or relocation prior to completion of an adequate standard road. The Whitebird Bridge on the Salmon River may also have to be reconstructed or improved.

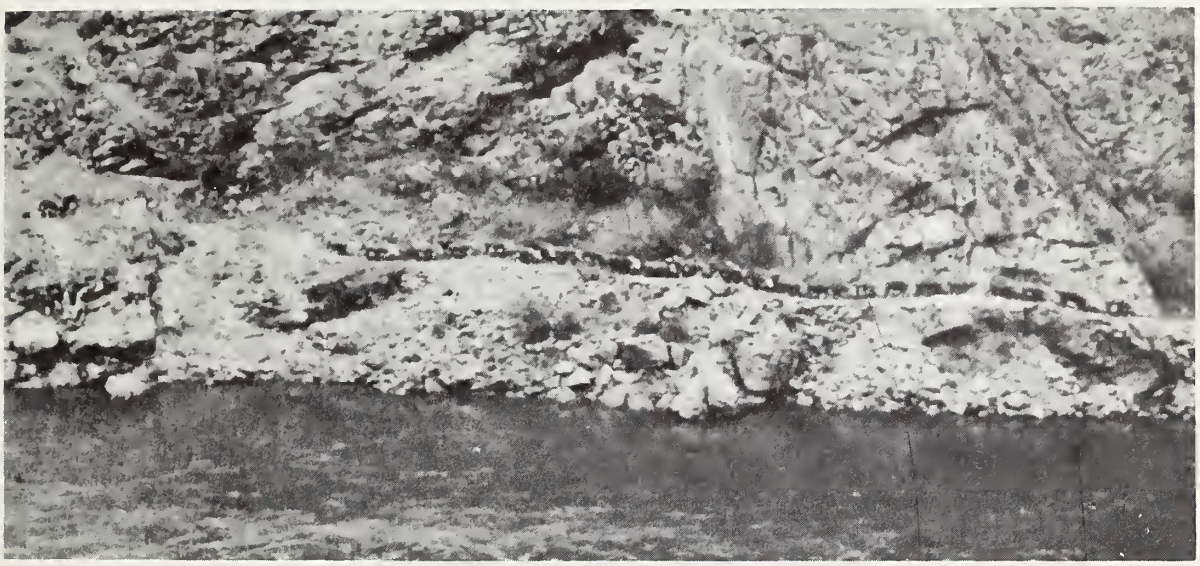
During project construction it is necessary that existing roads be maintained or reconstructed to adequate Forest Service standard to meet project created traffic requirements and to provide an equivalent level of service for the administration, protection, and use of the National Forest areas which they serve.

All replacement road facilities should be completed before existing facilities are flooded. The Forest Service should approve locations, designs, and standards of all roads constructed on National Forest lands. The project should replace information and direction signs and section line markers.

The project area should be resurveyed and all General Land Office corners which will be destroyed in the impoundment should be meandered. Cost estimate is found in Table No. 1.

The project access roads are not included in the project boundary. These should be covered by special-use permit to the licensee where they cross National Forest lands.

TRANSPORTATION



Transportation is and will be primitive. The upper picture shows cattle being driven to market on a Forest Service trail; the lower, wool sacks taken by boat to Lewiston. The project will disrupt these activities until replacement of transportation facilities are constructed.

Conditions of the permit should be adequate for protection of these lands. Rights-of-way should be vested in the United States.

Cost estimates of replacement roads are listed in Table No. 1.

b. Forest Road and Trail Bridges

West of the Snake River - Two road bridges and three trail bridges will be inundated by the proposed reservoir. The road bridges are N-422-14.1 across the Imnaha River above the mouth of Cow Creek and N-422-14.6 across Cow Creek. The trail bridges are on the Lower Imnaha River Trail No. 1713 and are designated 1713-4.0, 1713-4.1, and 1713-4.2.

In replacing the service provided by Forest Road N-422 the two bridges mentioned must also be replaced. Two additional bridges will be required across Horse Creek and Lightning Creek. (See Fish and Wildlife Section of this report for discussion of need for replacement of this road.) Service provided by Forest Trail No. 1713 will be replaced by the access road to the dam site, therefore replacement of the three trail bridges will not be necessary.

East of the Snake River - No road bridges will be affected by this project. Four trail bridges are in the reservoir area at Granite, Sheep, Kirkwood, and Bernard Creeks.

Implementation of Snake River management plan without the project would require several trail bridges across the Snake River for full coordination with Wallowa-Whitman National Forest and to avoid duplication of administrative facilities. These bridges would be considered at Pittsburg Landing, Sheep Creek, and possibly Saddle Creek at an estimated cost of $80,000 each.

Project construction would necessitate the replacement by the licensee of the four trail bridges on Trail No. 102. See the following section on trails for recommendation of possible construction of a

trail bridge across the reservoir at the Nezperce-Payette National Forest boundary.

Replacement bridges should be designed to fit the ultimate standard of the trail on which they are located.

Cost estimates of replacement bridges are listed in Table No. 1.

c. Forest Trails

A trail system west of the river has been construted and maintained to accommodate use by local residents, a limited amount of recreational travel, and for National Forest protection and administration. The Snake River Trails No. 1726 and No. 1775 parallel the river for most of their length. Trail No. 1726 extends from the end of Dug Bar Road No. N-422 south to Somers Creek. There is no river trail from Somers Creek to Pittsburg Creek. Travel between these points is by Trail No. 1769, which is a bench trail. From Pittsburg Creek south to Battle Creek Trail No. 1775 parallels the river, except for about four miles, south of Saddle Creek, where it climbs around the tow of Black Mountain. There is no river trail from Battle Creek south to the Low Hells Canyon dam site, and none will be required without a reservoir.

The situation east of the river is similar in that the entire 39 miles of Trail No. 102 from Pittsburg Landing to Brush Creek will be inundated.

Development plans without a reservoir include betterment and reconstruction of the existing river trails to keep pace with anticipated use. Within the Hells Canyon-Seven Devils Scenic Area several new trails are proposed to connect future ridge-top roads and bench lands with the river or reservoir.

With construction of a reservoir there will be need for a shoreline trail in all places where roads do not parallel the reservoir. On the Oregon side a shoreline trail will be needed from the end of the replacement Dug Bar Road No. N-422 south to Low

Hells Canyon Dam. This shoreline trail will be expected to handle not only reservoir-attracted recreation use but movement of livestock and game as well. It should be built to a high standard with adequate width for safety, and grade as near level as practical. It should generally be within 100 vertical feet above the flow line at all points. Existing trail connections should be replaced.

In order to provide the necessary services occasioned by project construction, a transportation facility connection will be required between Hells Canyon Dam and the end of Trail 102 near Brush Creek. This can take the form of a three-mile trail on the Idaho side or a 400-foot trail bridge to connect with the Snake River trail in Oregon. See Table No. 3 for cost estimates.

Sections located on the river bars and low benches will have to be relocated in the steeper rocky areas resulting in poorer alignment and high maintenance costs. This and the necessity for going in and out of major draws will result in the replacement shoreline trails within the National Forest boundaries being about 12 percent longer than the same trails now existing.

Every effort should be made to have the shoreline trails and bridges usable prior to inundation of the existing trails to provide for total administrative needs as well as for safety of the people using the pool. The Forest Service should bring the other trails affected by the project presently on the system up to an adequate standard to carry the estimated recreation travel upon completion of the project.

Estimated cost of replacing the existing Snake River trails to provide necessary service is found in Table No. 1. Estimated cost of completing the shoreline trail is also shown on Table 1. The need for these sections is project imposed for public recreation use and safety.

2. Communications

a. Telephone

Several private telephone lines exist under special-use permit within the project area. The only Forest Service line is that which extends from Buckhorn Lookout to Thorn Creek Guard Station. This line should be replaced by the project when the Guard Station is relocated.

Telephone communication with the project field office should be established immediately and maintained throughout construction.

The projected future Guard Station at Pittsburg should have telephone communication through Hat Point Lookout.

The planned Nezperce Forest work centers at Kurry Creek, Sheep Creek, and Granite Creek will need telephone communication with the district headquarters. Ground return lines branching from existing lines will serve these stations. Cost estimates are listed in Table No. 1.

b. Radio

Radio communication within the project area has not proven reliable except as it can be relayed via the fire lookouts, which are only manned during the summer. Several livestock permittees have radio-telephone links to Boise, Idaho, from canyon ranch headquarters.

Radio communication should be established to the project field office and the reservoir clearing crews from Forest administrative headquarters as a project expense.

Guard stations and patrol boats, planes, and helicopters should be radio-equipped during all periods when they are in use.

It is anticipated that reservoir administration will require Forest personnel in the canyons on

a yearlong basis. Adequate radio communications will be essential. Permanent, yearlong repeator stations will be needed at Dry Diggins, Grave Point, Buckhorn, and Hat Point. This equipment would be installed at the existing lookouts. Regular battery-operated station sets would be installed at Sheep Creek and Kurry Creek on the Nezperce. The Wallowa National Forest would have station sets at Thorn Creek and at Pittsburg when that facility is built. Cost estimates are listed in Table No. 3.

3. Administrative Sites and Improvements

The only administrative site within the project area is Thorn Creek Guard Station on the lower Imnaha River. This station is located on Wallowa National Forest and consists of a two-room house, barn, corral, and three miles of fence. A water system has been installed but other improvements or replacement of existing facilities have been postponed pending construction of the proposed reservoir. There are eight acres of seeded and irrigated pasture.

This station should be replaced along the dam access road in Corral Creek, Thorn Creek, or Tulley Creek. It should serve as a visitor information center and work center for campground maintenance crews and patrolmen on the north end of the reservoir. A boat dock, bunkhouse, horse barn, residence, office and corral will be the minimum initial requirement.

A site has been designated near Pittsburg Creek for future construction of a guard station following completion of the project. Development should keep pace with the need in the south end of the reservoir. Although this site is directly across from the large recreational and administrative site proposed at Pittsburg Landing, it has certain strategic advantages. This administrative site will be in the center of the heaviest reservoir recreational use, and man-caused fire hazard, in the central portion of the reservoir. It is centrally located for campground maintenance and has adequate room for expansion of facilities.

There is an established withdrawal for administrative site purposes at Little Bar. Without the project, work centers are planned at Kurry Creek and Sheep Creek and an administrative cabin at Granite Creek.

After project construction, sites would be at the same locations but would include a more complete set of facilities.

Administrative facilities needed during project construction should be provided by the licensee. Conversion of existing private buildings at Sheep Creek, Kurry Creek, and Dug Bar may adequately serve this purpose.

4. Fire Prevention, Preparation and Suppression

The Forest Service is the agency responsible for fire protection on both sides of the project area within National Forest boundaries. The State of Idaho protects the area north of the Nezperce Forest which is called the Craig Mountain Fire Protective District.

The Snake River and lower Imnaha River canyons have a long history of numerous and often severe fires. Very few of these have been man-caused. The worst recorded outbreak was in 1960 when dry lightning storms set a series of fires, many of which ran together to form five large fires in and around the project area. These five fires burned about 22,000 acres.

Fuel types below 4,000 feet elevation are characterized by extreme rate of fire spread. This is a result of a combination of factors of light, flashy fuels, steep terrain and prevailing updrafts during the heat of the day. Resistance to control is relatively high for the fuel type because of poor access and difficulty of travel in the rugged terrain. As a rule, the initial attack must be airborne. Above 4,000 feet, the fuel types change from grass and brush to predominantly timber. The remaining 2,000 to 3,000 feet to the ridge top is generally even steeper and rockier than the terrain below. Any fire in the canyons presents an immediate and serious control problem.

The heaviest recreation use of the canyons has occurred during the spring season when fire hazard is low As soon as the grass dries out in June, the heat at lower elevations often discourages entry. The reservoir will bring greatly increased public use after June and throughout the critical fire period.

For several decades, there has been little mining activity. Logging is occurring near the top of the Snake-Salmon divide. Private occupancy of the canyon bottoms and slopes takes place almost exclusively during the winter grazing season and has caused little added fire risk. One present source of increasing man-caused fire hazard is upland game bird hunters who enter the canyon early in September when it is still very dry. Summer use by fishermen is also increasing.

Most lightning strikes occur in the upper half of the elevation range, but severe storms may hit the lower levels, as in 1960. These are very dangerous. Fuels are drier and flashier and there is less chance of rain accompanying the storm. Relative humidity is lower while temperatures and evaporation rates are higher. Fires fanned by strong winds have been known to reach several hundred acres in less than one hour.

Most man-caused fires would tend to originate near the canyon bottom where the spread uphill would be almost explosive during the fire danger season.

The Forest Service is currently engaged in making a special comprehensive fire plan to deal with the unique problems of the Snake River canyon. The canyon slopes have been divided longitudinally into blocks the boundaries of which are determined by prominent topographic features usable as natural fire breaks.

These preliminary blocks cover the entire project area. Additional blocks will eventually cover the Imnaha River canyon up to the point where it emerges from the Wallowa Mountains.

Each block is represented on a map showing how the block may be subdivided by fire line construction and natural breaks to confine fire to the specific area of origin within the block.

This photograph illustrates the difficulty of controlling fires on the steep rocky canyon slopes.

This intensive plan will supplement, rather than replace the normal fire plans for the ranger districts involved. Prevention contacts by river boat patrol would be part of the Snake River management plan.

No extra protection methods are employed at present. Regular lookout coverage on the Idaho side includes Dry Diggins, Cold Springs, and Grave Point. Oregon lookouts include Lookout Mountain, Hat Point, and Buckhorn. These lookouts provide cross-canyon viewing which is essential for adequate coverage of the canyon. Air patrols from both the Oregon and Idaho Forests provide further detection facilities.

Upon project completion the public contact and fire prevention program would have to be intensified. The two Wallowa National Forest stations and patrol boats would also serve fire prevention and suppression purposes. The maintenance crews and guards would form an initial attack force for fires occurring near the reservoir. They should be adequately equipped with portable pumps, hose, and tools suitable for control and mop-up of canyon fires. Aerial water tankers equipped with snorkles for in-flight loading will be used by the Forest Service in fire fighting when the reservoir is filled. During the construction phase, this equipment would have to load, and probably be based and refueled, on Brownlee or Low Hells Canyon Reservoirs. Effectiveness within the vicinity of this project would thus be somewhat reduced.

Increased use east of the river will require assignment of recreation and fire prevention guards to the Kurry Creek, Sheep Creek, and Granite Creek work centers. A minimum of one boat with a four-man fire crew and high pressure pump should be assigned to the Sheep Creek work center. As recreational use on the pool increases, another boat and crew will be assigned to Kurry Creek.

Adequate fire breaks will be needed around all developed areas. These breaks will require annual maintenance.

Existing lookout coverage of the project area would not be sufficient for the construction phase since

lookouts cannot readily see into the canyon bottom where the work would be going on. Temporary coverage would be needed for construction and clearing areas during hazardous fire weather.

The existing lookouts would not give adequate coverage for the increased recreation use after the reservoir is filled. The Forest Service will have to construct more stations to insure the earliest possible detection of fire. Number and location of these additional stations should be determined by study during the early construction phases of the project.

The Memorandum of Agreement made with the licensee to cover operation and maintenance of the project should also define fire prevention and control responsibilities of each party, and the licensee's liability for project-caused fires.

During project construction an annual cooperative fire plan should be prepared by the licensee and the Forest Service defining the responsibilities and liabilities of each. Provision should be made in the plan for manpower and equipment sufficient to meet expected needs. It must be recognized by all concerned that the construction phase of this project will present extremely hazardous fire conditions. The fire plan should be revised as necessary to cope with changing situations throughout the various phases of the construction. It should provide for use of the licensee's manpower and equipment on all fires in the project vicinity, regardless of origin.

The licensee should employ one or more men whose sole duty during fire hazard periods as designated by the Forest Service will be to insure compliance with fire laws and requirements. They should be the designated fire liaison officers with the Forest Service. Their duties should include supervision of all debris burning. It is essential that they have adequate fire-fighting experience.

Clearing crews should be trained in fire suppression and should be available for this work immediately upon request. They should have communication and transportation facilities available at all times during periods of fire hazard.

When the project construction crews are working with National Forest protective boundaries during periods of fire danger, the Forest Service should assign one or more qualified fire control officers to the operation. These representatives will advise on fire prevention and precautions that must be taken in accordance with Forest Service protection standards and requirements of law and will also issue burning permits. Specific fire protection and suppression standards are to be included in an annual fire plan.

Some suggestions for inclusion in the annual cooperative fire plan are as follows:

a. It may be desirable to maintain a temporary fire lookout close to the dam construction area if blasting or similar activities must be carried on during periods of high fire hazard.

b. If the service provided by the Snake River trail or Dug Bar road is not replaced by the time the reservoir begins to fill, the licensee should provide a helicopter for transport of fire crews and tools during fire season. It should be available on twenty minutes notice with a qualified pilot.

c. Many construction workers will spend off-duty days in the project area fishing, hunting, etc. Special precautions will be necessary if, as on week-ends, many tourists are also visiting the dam site. Patrol by vehicle or aircraft may be necessary.

d. The licensee should provide tools and equipment needed for control of fire. These may be strategically located tool caches, water pumps, tank trucks, bulldozers or other equipment deemed necessary.

e. Reference should be made to the cooperative fire plans with Idaho Power Company for dam and power line construction in the canyon area for clauses to fit the anticipated needs and conditions on this project.

5. Project Created Slash Disposal

The licensee will assume full responsibility for disposal of project-created slash. Disposal should be by burning during the winter months when the risk of disposal fires escaping from control will be lowest. The use of a chipper may be an alternative where disposal is required during fire season to prevent creation of a hazard, as along rights-of-way.

It has been estimated that there will be only 750 acres of reservoir clearing. This is about four and one-half percent of the reservoir area. There will not be large or continuous amounts of slash. Clearing should be done by zones to minimize the size of individual concentrations. Piles of windrows should be made as far below the flow line as practical to reduce the chance of damage to uncleared areas during the burning operation. The weather conditions at time of burning will be all-important. It seldom rains in the reservoir area. Fire can spread through the dry grass most of the year, particularly when there is wind.

The cost of additional services needed during the slash disposal period is itemized in Table No. 2.

A slash disposal plan should be prepared annually by the licensee to outline in detail the procedure to follow in reducing the current slash accumulations. The plan should be made prior to any clearing.

6. Special Project Clearing Requirements

Clearing boundaries above the flow line should be marked on the ground within one year after beginning of construction. Five feet vertically above the flow line should provide an adequate buffer for hydraulic wave action. Those areas where timber or large brush is found along the flow line are almost invariably in draws which will form bays well protected from waves. To preserve as near natural a shoreline as possible in front of recreation areas, clearing should be confined to high water level unless wave action will result in unsightly or hazardous conditions. Selected material should be retained as a wood supply for developed recreation areas where firewood will be difficult to find. All floatable material should be burned

during the first burning period following cutting. Any stumps located in front of potential recreation sites should be grubbed out and burned.

In clearing for road construction, special care should be taken to preserve aesthetic values along the route. Burning should be done within the cleared right-of-way. Stumps along permanent roads should be cut flush with the ground. Debris piling should be done in such a manner that burning will not damage foliage beyond the clearing limits.

If, during the reservoir clearing, it is evident that an area may slide due to the impoundment of water it may be necessary to stabilize the soil to prevent sliding. Administrative personnel should be alerted to detect these conditions when the clearing line is marked.

Fences and phone lines, to be disposed of, should have the wooden material gathered and burned and the wire removed to approved disposal areas, or buried.

7. Long Range Landownership Adjustment Plan

Forest land adjustment plans do not reflect the needed acquisition program created by this project. The present plans are satisfactory for the interim until definite project land acquisition plans become known. They should then be revised to show current needs.

Forest plans recognize the need for acquisition of key private lands along the river if no reservoir is built.

Desirable recreation development sites outside the project boundary which are on public land or will become public land should be withdrawn from mineral entry in accordance with Forest Service policy. The acquisition program by the licensee should be completed prior to completion of the construction phase of the project in accordance with the license and the Federal Power Commission requirements.

8. Long Range Right-of-Way Procurement Plan

No up-to-date right-of-way procurement plans have been prepared. The licensee should acquire and furnish to

the Forest Service free and unrestricted public rights-of-way on all National Forest system replacement roads, and project access roads constructed, or relocated across private lands and which are essential for National Forest programs. When the licensee's land acquisition policies are known and the Forest's land acquisition plan revised, a procurement plan should be made to secure rights-of-way which may be needed but not furnished by the licensee.

The Forest Service does not have rights-of-way on the Horse Creek, Lightning Creek or Cow Creek roads. These should be procured in their entirety.

Existing roads and trails east of the river have either a deeded or prescriptive use right-of-way. It is planned to purchase rights-of-way prior to construction of the Kurry Creek and Big Canyon access roads.

9. General Administration

Current administrative work load in the vicinity of the proposed project is mainly involved with the winter grazing allotments. Fire protection is the most important function during the summer. Recreation, although increasing rapidly, has not yet assumed major importance.

During project construction, the Forest Service should be represented by a highly qualified liaison officer whose duties will include preservation of existing Forest resource values, planning of recreation facilities, fire protection requirements, and facilitating the work of the licensee and his contractors. Other assistance in engineering, fisheries, rights-of-way, land adjustment, recreation, and fire protection should be available as necessary to check plans and accomplishments to be approved by the Forest Service. Cost estimates are listed in Table No. 4.

Administrative needs following project construction would include a yearlong recreation guard to be stationed at the relocated Thorn Creek Guard Station. His duties would involve mainly public contact during the season of heavy recreation use: April through November. Another yearlong man could be employed to good advantage on maintenance of campgrounds, trails, boat docks, and other public facilities. The Nezperce requirements would be similar.

Two seasonal men should be employed during the eight months of heaviest public use. A boat patrolman will be needed as soon as the reservoir fills, and later, upon development of Pittsburg Guard Station, a fireman at this location. These men would, of course, perform maintenance and betterment work in addition to their primary duties. Patrol and protection should be correlated among the National Forests involved.

Memoranda of Agreement should be made with the licensee to cover both the project construction period, and then again to cover the project operation and maintenance period.

The construction period agreement should cover fire prevention and control responsibilities, protection of the National Forest lands, and resources, replacement of improvements, and recreation planning. Equipment operation areas should be defined to protect scenic values. An erosion control plan for stabilization of disturbed soil should be included. Cooperative financing needs to be defined. Rights-of-way and land acquisition policies also must be covered. Representatives of the Company and Forest Service men should be designated for liaison purposes. The agreement covering the operation period should specify measures necessary for safety of livestock, game, and the visiting public. The fire prevention and control responsibilities of each part to the agreement should also appear.

C. Project Impacts Upon State and Private Forestry

1. Timber

There is not likely to be a direct effect on privately owned timber due to this project. A small amount of privately owned timber surrounding the project area will be indirectly affected, since the pool may render it more accessible for removal.

Some of the lands to be inundated support timber of merchantable size which is of a species for which no demand exists. Potential demands are unpredictable.

In the Deep Creek, Somers Creek, and Cougar Creek drainages, a small quantity of timber is owned by Boise-Cascade

Corporation. Property lines were run and this timber cruised about four years ago. Company records show slightly over four-million feet of mostly ponderosa pine. The cost of removal appears to be far in excess of the value of the timber unless it can be dumped into the reservoir and rafted to a road end. In order to remove the timber by any means other than helicopter, Boise-Cascade Corporation would have to build some roads across National Forest land. Removal of this timber is highly undesirable from an aesthetic or soil stabilization viewpoint. Because the reservoir creates a situation of economical removal, the licensee should purchase this timber and land to protect the environment and prevent serious damage to resource values.

2. Protection

Protection of lands within the project boundary in the State of Oregon is the responsibility of Wallowa-Whitman National Forest. No State or private agencies are involved. The same is true within the boundaries of the Nezperce National Forest.

The area north of Nezperce National Forest is protected by the State of Idaho. The added impact on protection will be similar to that experienced by the Forest Service. Because of the vast amount of intermingled State and private timber lands in Idaho, a strong State protective organization is vital. The public interest could best be served by continuing the present arrangement of protection responsibilities.

3. Forest Industries

The local livestock industry will be adversely affected by this project. The nature and magnitude of this impact has been discussed in other sections of this report. Forest industries will be relatively unaffected. Placer mining is doomed on the Snake River, but most bars are worked out and a Bureau of Mines field study conducted in 1962 showed not over five cents worth of gold recoverable per cubic yard in 16 placer areas tested. Mineral exploration may be encouraged by better accessibility to the rougher portions of the canyon.

The probable stimulus to the recreation industry is discussed in Section V of this report.

VII. CONCLUSIONS

		Refer to Page
1.	The project area is but a portion of a vast spectacular canyon land management complex.	1
2.	Details of access routes, fish passage, transmission lines, etc., having severe impact are not firm at this time; thus it is only possible to make general comments regarding them.	3,4
3.	Key resource values in the canyon area are grazing, wildlife habitat, recreation, and watershed protection.	9
4.	The project will cause profound changes in human use of the impact area, as well as to use patterns of fish and wildlife, particularly winter big-game range and anadromous fish streams.	10,11
5.	Accessibility and a wider variety of recreation opportunity will be provided by the project, although there will be a substantial reduction in present aesthetic, scenic, and historical values of the canyon complex.	11
6.	Many important archeological and historical sites will be inundated.	15,16
7.	All resource management programs of the Forest Service in the canyon and adjacent areas will be affected by the project making it essential for the total area to be managed as a unit under uniform policies.	11
8.	The recreation potential of this area is directly related to preservation and enhancement of the fish and wildlife resource, and the protection of the area from wildfire.	28

CONCLUSIONS (Continued)

		Refer to Page
9.	The reservoir will occupy 15,000 acres of critical winter game range. An additional 1,300 acres around the pool will be lost to construction, recreational, and other developments.	37
10.	Much of the existing transportation system in this area will be inundated or rendered unusable.	53
11.	Continued domestic livestock grazing must defer to the needs and use patterns of displaced big game, and public recreation.	39 - 42
12.	Timber is of minor commercial but prime aesthetic importance at elevations below 4,000 feet.	43
13.	Permitted land uses can all be administratively terminated or revised as needed when project construction begins.	47
14.	Public use and safety will be contingent upon new and replacement land access to the canyons, rims, and mountain areas.	53,54
15.	Project construction and resultant greatly increased public use of lower elevations will tremendously complicate the already severe fire protection problem.	57,58
16.	There is a scarcity of land topographically suited to recreation development nearly all the way around the shoreline of the pool.	26,27
17.	Soils on the steeper ground are generally thin and often unstable.	13,14

VIII. RECOMMENDATIONS

		Refer to Page
1.	The licensee must be responsible for stabilization and repair of any slide areas that develop as a result of reservoir operation.	14
2.	The Forest Service should make a soil survey around the project area to aid in determination of compatible levels of use of various resources.	14
3.	The licensee must finance complete archeological exploration to be completed by the appropriate State institutions, including the verification of historical sites, prior to impoundment. Surveys conducted on National Forest lands will be authorized by the Forest Service in accordance with the Antiquities Act and artifacts found on National Forest lands will become the property of the United States Forest Service.	15
4.	The licensee should obtain rights for archeological salvage from private land owners within the project in accordance with the overall recreation development plan for the canyon area and to be specified in the approved Exhibit R.	15,16
5.	The Forest Service will develop potential recreation sites at higher elevations around the pool in coordination with pool-side development to fully utilize the variety of Forest settings and climatic conditions, reduce fire threat, and disperse use.	22

RECOMMENDATIONS (Continued)

		Refer to Page
6.	The existing intensive multiple-use plan covering all National Forest lands affected by the project, including the Hells Canyon-Seven Devils Scenic Area, intermingled private lands, and other public lands forming an integral part of the project-related area, should be refined as project impacts become more specific.	20,21
7.	The final project boundary should be set at normal full-pool elevation by the Federal Power Commission.	8
8.	To minimize resource conflicts and to promote maximum efficiency in public land administration all lands immediately above the reservoir flow line except those lands needed for operation of the project by the licensee should be acquired by licensee and administered by the Forest Service. Additional private lands at higher elevations within the Forest boundary should be acquired by the licensee as needed for the Forest Service to offset project induced impacts.	24,25
9.	Channel improvement and navigational markers be installed as necessary to provide safe boat travel to Low Hells Canyon Dam.	22
10.	Low elevation sites be developed only after full consideration of fire prevention, potable water supply, and adequate sanitation to prevent water contamination.	13,14,22
11.	Boat launching sites be equipped to permit their use at all pool elevations.	25

RECOMMENDATIONS (Continued)

		Refer to Page
12.	Appropriate markers, meeting the approval of the Forest Service, be installed on access routes and on the perimeter of the reservoir to identify verified historic sites.	16
13.	Detailed surveys of all reservoir recreation sites should be made by the Forest Service, preferably before project construction begins.	26
14.	The Forest Service master recreation plan for development of the entire canyon area will be the controlling plan for both licensee and Forest Service recreation development.	20,21,26
15.	Development of the Hells Canyon-Seven Devils Scenic Area should be accelerated.	28
16.	The Forest Service conduct a fish habitat survey and plan of development of tributary streams which may partially mitigate the project-affected habitat of anadromous and resident game fish. To facilitate these independent studies and because of habitat responsibilities related to the main stem of the Snake, the Forest Service should be a participant in all fish habitat studies related to the project.	29
17.	The licensee should acquire private lands near the reservoir as replacement big-game habitat areas, in the name of the United States, to be managed by the Forest Service, to partially offset loss of key winter game range on flooded lands.	33,37

RECOMMENDATIONS (Continued)

		Refer to Page
18.	In addition to licensee acquisition of private lands as partial mitigation of inundated wildlife (See Recommendation 17) habitat, the Forest Service develop an accelerated program of range adjustment and habitat improvement to assist in meeting the food and cover requirements of wildlife and domestic livestock.	37,42
19.	The Forest Service should make a study of summer range to determine optimum productive capacity of all resources, identify compatible levels of big game use, etc.	39
20.	The licensee should construct watering and other facilities for livestock and game to a level necessary to permit use of all remaining usable forage areas.	42,43
21.	The licensee should replace the existing transportation system with improved road and trail access facilities to provide the level of public service available before the project and necessary to meet project-induced needs.	42,43 51 53,54
22.	The licensee should replace or construct fences adequate to restore the necessary control over livestock movement.	41
23.	The licensee should fence project-created hazards to exclude game and livestock. Where passageways are necessary for unrestricted movement of animals, the licensee should provide them.	41
24.	A shoreline trail should be considered as adequate replacement of service now being provided by the section of the Dug Bar road east of the Imnaha area.	49

RECOMMENDATIONS (Continued)

		Refer to Page
25.	The shoreline trail system should be constructed before the reservoir fills.	54
26.	The licensee should meander and witness above the flow line all surveyed corners and land lines which will be destroyed by the project.	51
27.	The licensee should employ one or more men whose sole duty during periods of fire hazard will be to insure compliance with fire laws and requirements.	60
28.	The Forest Service should designate a liaison officer to represent all administrative units affected by the project during construction.	64

APPENDIX

A. Grazing History

On the Oregon side, the first grazing of domestic animals in the Snake River canyon is believed to have occurred about 150 years before the coming of the first white settler. The Nezperce Indians acquired horses about this time and they customarily wintered with them in the canyon north of Saddle Creek. The first permanent white settler was a placer miner known as Dad Somers who arrived about the time of the Civil War. When he took up a homestead on Somers Creek and branched out into the sheep business about 1880, Mr. Somers probably became the first white man to graze livestock in the Snake River canyon. Tulley Brothers took the first cattle to Imnaha River, wintering 200 head in Tulley Creek in 1880. By about 1905, all the choicest locations were taken up as homesteads. The era of destructive grazing was in full swing. More cattle used some ranges than there are sheep using them now. Nearly all of the Snake River and lower Imnaha lands now a part of Wallowa National Forest first came under Forest Service jurisdiction on March 1, 1907. In 1908, livestock were grazed under permit for the first time.

Control of numbers and season of use was not the only problem overcome by Forest Service administrators between 1907 and the present. In 1920 the goatweed (Hypericum perforatum) was introduced to the Snake River benches by a band of sheep brought to Somers Creek from Idaho. By 1934 there was so much apprehension over the spread of this weed that an experimental control program was instituted on the winter ranges. About 5,000 acres were treated. No chemical or mechanical control could be devised which was practical, and many stockmen believed that the days of the industry were numbered in the canyons. However, a biological control was discovered. This is the beetle (Chrysolina hyperici) which lives on goatweed. The first plantings were made about 16 years ago by Forest Rangers and today the goatweed is little more than a curiosity, held in check by the goatweed beetle.

A general upward trend in permittee management plus better administration by Forest officers has brought the grazing resource back to its present improved condition. Plant succession on the abused ranges is now progressing upward from weeds to annual grasses, to less desirable bunchgrasses, to more desirable bunchgrasses.

All areas have not made the same amount of progress, nor have all range problems been solved. Many sites, which suffered the worst abuse in the past, are still far from their optimum productivity. Condition and trend surveys are up-to-date. All allotments have been surveyed in 1957 or later and management plans are being written according to schedule.

Future management plans have the objective for producing the maximum amount of the more desirable types of forage for livestock and game compatible with other resource uses.

In Idaho, as in Oregon, grazing on the Snake River slopes predates the establishment of the National Forest.

In the early grazing history, dual use by both sheep and cattle was common. Throughout the years a large sheep outfit has bought up the private lands which were the commensurate ranch property for the cattle permits which existed in Kirkwood and Sheep Creek and the range was converted to sheep use. The Kurry Creek area has been used by a large cattle outfit, the Circle C Ranch Company, since 1934. To improve management, they have installed many drift fences and water developments.

The range land around Big Canyon had dual use in the early days similar to that in Sheep Creek and Kirkwood Creek. Evidences of past overuse are obvious in many places, and a downward trend in both soil and vegetation is still being experienced in certain areas.

B. Analysis of Project Impacts on Individual Grazing Allotments

Without this project, grazing could continue on most of the affected allotments indefinitely. The project will intensify the demands of other uses, chiefly recreation and wildlife, on the lands within these allotments. Management must move ahead fifty years almost overnight. Classification of lands to meet needs and correlation of multiple use with the recreation development plan for the area will become top priority.

A brief discussion by allotments follows:

Wallowa-Whitman National Forest

1. Cherry Creek Sheep Allotment

This is the allotment upon which the dam and its appurtenant facilities will be located. Although the base ranch will not be inundated, over 50 percent of the flatter areas used for feed grounds, lambing pens, etc., will be inundated or occupied for recreation, construction, or operational sites connected with the project. Continuation of the use of this allotment as an economic winter unit will not be practical. Some summer allotments in the Wallowa Mountains are involved. The permittees could retain these by re-establishing commensurate property elsewhere in Wallowa County.

2. Cow Creek-Toomey Gulch Cattle Allotment

This allotment is used by one permittee but is in two units about three miles apart. The Imnaha Arm of the reservoir would occupy a portion of the west, or Toomey Gulch unit. It would also obstruct movement of livestock by lengthening the road distance between units to at least 25 miles. The alternative would be for the project to furnish a stand-by barge service for the movement of livestock. The Toomey Gulch unit will probably be crossed by the permanent access road and the key areas occupied by stockpile areas and recreation sites. The Cow Creek unit, although not touched by the reservoir, would become an isolated and uneconomic area unless combined with another allotment.

3. Dodson-Haas Cattle Allotment

This allotment will be cut into two halves by the Imnaha Arm of the reservoir. The home ranch on the Imnaha River will be inundated. All of the river bottom lands and the benches on the west side will be inundated or occupied by the access road and recreation sites. There is some hay land in Horse Creek which could be used in partially re-establishing commensurability. The permittees hold summer range permits on allotments to the west which will not be directly affected by this project. The portion of this allotment west of the Imnaha River will be occupied by the project access road, stockpile areas, recreation sites, fish canal, etc. It will be impractical to continue the livestock operation here. The unoccupied land should be reserved for wildlife habitat and enhancement of recreation sites.

4. Imnaha River Cattle Allotment

The loss of area through inundation will be insignificant. Project impact on this allotment will be minor as far as loss of usable forage is concerned.

5. Log Creek Cattle Allotment

The same comments apply to this allotment as to the Imnaha River allotment immediately preceding. They are located on opposite sides of the middle gorge of the Imnaha River.

6. Lightning Creek Cattle Allotment

This allotment is operated in conjunction with the Lower Cow Creek allotment, where the home ranch and commensurate lands will be inundated. Part of the hay lands on this allotment will be inundated, leaving too little to re-establish commensurability. The permittees have permits on summer allotments to the west not directly affected by this project. They should be given the opportunity of retaining these by establishing commensurate property elsewhere in Wallowa County. Movement of livestock to and from summer ranges from this allotment would be seriously impeded by the Imnaha Arm of the reservoir. Unless a stand-by barge service is provided, the reservoir will make it necessary to drive stock at least 10 miles further each way.

7. Lower Cow Creek Cattle Allotment

This allotment will have the home ranch and irrigated hay lands inundated. It will be impossible to re-establish commensurability within the allotment. The same comments and recommendations apply as for Lightning Creek allotment which is preceding.

8. Lone Pine Cattle Allotment

This allotment will have almost 20 percent of its total area inundated, including the home ranch and all lands that could be used to re-establish commensurability. Some private lands remaining above water are key recreation sites. The permittee uses National Forest land only from November 16 to April 30 and has no summer permit.

9. Deep Creek Sheep Allotment

This permittee will lose his base ranch at Xmas Creek along the Snake River. There will be no chance of re-establishing commensurability. His home is at Council, Idaho, and there is little chance that he would acquire commensurate land in Wallowa County.

10. Roland Creek Cattle Allotment

This allotment is managed in conjunction with the Cat Creek and Tryon Creek allotments. The home ranch house burned in 1960 and was not rebuilt. It was just above the reservoir flow line. Included in this ownership is a large tract of private land known as the Electrolytic Copper Claim. It is a separate unit of about 500 acres, located three miles upstream along the Snake River. Waived for private land credit it is used as a pasture.

11. Cat Creek Cattle Allotment

The home ranch and commensurate hay lands on this allotment will be inundated. There will be no possibility of re-establishing commensurability on the allotment. Private lands remaining above the flow line will be quite close to the reservoir. They should be acquired by the project to protect recreational values. This permittee has a summer allotment on the National Forest for the period May 1 to October 31 at Marr Flat.

12. Tryon Creek Cattle Allotment

The home ranch is located on bench land more than a mile from the reservoir flow line. Only about 56 acres of private land will be inundated. The reservoir will occupy benches and flats near the river which are of some importance to winter grazing. These are National Forest lands.

The high bench land around the ranch will eventually become critical winter game range if populations increase and lower areas are occupied by recreation developments. Although this bench, which extends from Tryon Creek to Somers Creek, is about 1,300 feet above the reservoir flow line, portions of it will probably become key areas for commercial resort and hunting lodge type facilities, particularly if road access can be provided.

The summer range is on top of the ridge adjacent to this allotment, on the southwest. The project will not create any problems in moving livestock.

Private lands within one-half mile of the reservoir could be acquired to protect recreational and aesthetic values without interference to the livestock operation if grazing use was allowed to continue.

13. Pittsburg-Somers Creek Sheep Allotment

This allotment will lose 5 percent of its grazing capacity through inundation. No reduction in permitted numbers of stock will be necessary due to the reservoir as stocking is presently more than 10 percent below the safe carrying capacity. The home ranch at Pittsburg Creek will be inundated. The permittee should be given the option of re-establishing it at the Somers Creek ranch. This ranch is more than one mile from the reservoir flow line and it is not in an area of vital importance for recreation. It is doubtful that commensurability can be established on this property. The permittee will probably have to purchase other lands outside the Snake River canyon. Some of his lands, particularly near Pittsburg Creek, will be key recreation areas. Lands in the Somers Creek area within one-half mile of the flow line should be acquired to protect and enhance recreational sites.

The permittee's summer ranges are on the ridge to the west and also in the northeast portion of the Wallowa Mountains. The project will not cause stock movement problems.

14. Temperance Creek-Snake River Sheep Allotment

The effect of the project on this allotment will be minor except that the home ranch and all the hay fields at the mouth of Temperance Creek will be inundated. This area is extremely important game habitat, even for migratory water fowl. There is not sufficient hay land above the flow line to re-establish commensurability. Mitigation of inundated wildlife habitat would present a serious problem on this allotment. The winter snow line is much lower in the upper canyon, often coming below the high bench lands. Private lands within the allotment, including those remaining above the flow line at the mouth of Temperance Creek, should be acquired by Wallowa National Forest and managed primarily as wildlife habitat.

The permittee's three summer allotments are in the foothills of the Wallowa Mountains to the southwest. There would be no problems of moving livestock from summer to winter ranges, etc., caused by the reservoir.

15. Saddle Creek Cattle Allotment

The total direct effect of the project on this allotment will be the inundation of 29 acres of range along the Snake River which has been classified as unusable. No problems are anticipated.

Nezperce National Forest

1. Pittsburg Allotment

Prior to 1929 the Pittsburg allotment was grazed by sheep. In the fall of 1929 the private lands were purchased by a large cattle company and cattle have been grazed there ever since. This allotment and adjoining private land serves as winter range for 900 head of cattle.

The impact of the reservoir on the Circle C Ranch operation will amount to a flooding of the hay meadows and ranch buildings and a portion of the Pittsburg allotment. There will be 470 acres of usable National Forest and private waived range lands inundated. The net effect of the inundated range land will reduce permitted grazing use by 40 cow months on private waived lands and 175 cow months on the government lands.

An additional 700 acres of usable private land that is not waived to the Forest Service for management will also be flooded. Loss on this private land will be 500 cow months. An area of hay meadow is included which produces 150 tons of hay per year. There are 9,645 acres of National Forest land; 2,416 acres of Circle C land; and 400 acres of State land within the boundaries of the big game winter range, which includes the lands below pool level. Within this big game winter range there are 792 cow months under private permit and 2,213 cow months under regular grazing permit.

2. Kirkwood and Granite - Sheep Creek Allotments

These sheep allotments are grazed by a single permittee as winter units. They are made up of the old Granite

Creek Cattle and Horse Allotment, Kirkwood Cattle and Horse Allotment, and the original Granite and Sheep Creek Sheep and Goat Allotment. With the combination of these sheep and cattle allotments, the end of dual use by cattle and sheep, and improved management, the allotments are showing some improvement; however, downward trends in both soil and vegetation can be found in certain areas.

The winter use on these allotments is intimately tied to river bars for lambing, shearing, and supplemental feeding, and to the present river trail for up and down river sheep movement. There are few benches such as exist across the river in Oregon. Because of the excessively steep canyon walls, there will be very little ground where sheep may safely get to the reservoir edge for water.

The relocated river trail will be on much steeper ground than at present. Maintenance of a high standard trail above the pool would be virtually impossible with sheep use on the steep back slopes that would be necessary. These factors nullify the carrying capacity of the allotments. The preference permit should be waived to the Forest Service. Permitted use on these allotments amounts to 34,448 sheep months on public land and 2,115 sheep months on private land.

There are 1,492 acres of private land within the big game winter range. This land has a carrying capacity of 1,139 sheep months as shown by the private land permit. In addition, there are 22,500 acres of National Forest land within the big game winter range, which has an estimated carrying capacity of 14,018 sheep months as indicated by existing grazing permits.

3. Big Canyon Allotment

This allotment has been used by sheep since 1919 except for dual use from 1926 to 1939 by cattle in the upper elevations. This dual use was abandoned in 1939 and a reduction in the permitted number of sheep was made. By comparing the old history of this allotment with what is on the ground today we can conclude that the vegetative trends are upward in most places.

The impact of inundation on this sheep allotment will result in only minor reduction in carrying capacity, since most of the operation is conducted on the benches above the flow line.

However, there are 3,557 acres of public land and 528 acres of private land within the big game winter range. Within this game range are an estimated 4,591 sheep months on public land and 885 sheep months on private land.

TABLE NO. 1

Replacement of Existing Facilities, Project-Imposed and Replaced as a Project Expense

Existing Facility	To Present Standard	To Needed Standard
1. Thorn Creek Guard Station (Wallowa-Whitman N.F.)	$ 11,100	$ 77,500
2. Bridges		
a. Road Bridges (Wallowa-Whitman N.F.) (Nos. 2, 3, and 4 might be replaced as trail bridges)		
(1) Imnaha River, 135-foot	$ 35,000	$ 60,000
(2) Horse Creek, 40-foot	Non-Existing	25,000
(3) Lightning Creek, 40-foot	16,000	25,000
(4) Cow Creek, 40-foot	16,000	25,000
(Needed standard is 24-foot width, present is 14-foot)		
b. Trail Bridges (Nezperce N.F.)		
(1) Kirkwood Creek, 24-foot	$ 4,800	$ 4,800
(2) Bernard Creek, 20-foot	4,000	4,000
(3) Sheep Creek, 40-foot	8,000	8,000
(4) Granite Creek, 30-foot	6,000	6,000
3. Roads (Wallowa-Whitman N.F.)		
a. Dug Bar, N-422 (11.5 miles)	$391,000	$ 977,500
(See Trails--this road may be replaced by new 38-mile shoreline trail.)		
4. Trails		
a. Snake River Trail (Wallowa-Whitman N.F.)		
Inundated (52.2 miles)	$313,200	
Needed replacement (66 miles)		$1,188,000
New trail to complete shoreline system (38 miles)		$ 684,000

TABLE NO. 1 (Continued)

Existing Facility	To Present Standard	To Needed Standard
b. Snake River Trail (Nezperce NF)		
Inundated (39 miles)	$234,000	
Replacement (44 miles)		$800,000
New trail to complete shore-line system (12 miles)		$216,000
5. Resurvey and Meandering of GLO Survey Corners		
Approximately 50 Corners	$ 25,000	$ 25,000
6. Telephone Lines (Wallowa-Whitman N.F.) (1 mile)	$ 1,500	$ 1,500

TABLE NO. 2

Administrative and Protective Service, Project-Imposed and Financed as a Project Expense

Item	Estimated Annual Cost
1. Extra Fire Protection:	
a. Air patrol	$ 2,000
b. Ground patrol	2,000
c. Fire tool caches	500
d. 2 power boats with pumps	5,000
e. Radio net	2,000
f. Fire control officers	6,000
*g. Transportation barge	7,500
h. Temporary lookouts	4,000

* Based on 2-year use of licensee's barge needed if existing trail is inundated prior to completion of the new trail.

2. Slash Disposal Hazard Protection (Included in Part 1, above)

TABLE No. 3

Recommended Facilities to Meet Additional Use
Created by the Project

	Estimated Cost	
	Licensee	Forest Service
Facilities (Wallowa N.F.)		
6 campgrounds and picnic areas on access road (112 acres)		$ 863,000
3 observation points near access road	$ 88,500	219,250
2 waterfront sites near access road		192,000
3 campground and picnic areas near Dug Bar Road (32 acres)		26,000
17 campgrounds and picnic areas - no road access		121,225
Boating facilities at High Mountain Sheep Dam	$188,250	
Facilities (Payette N.F.)		
Either: Trail, 3 miles	$ 66,000	
Or: Trail Bridge, 400-foot	$ 44,000	
Facilities (Nezperce N.F.)		
2 campground and picnic areas with road access (237 acres)		$ 740,900
6 campgrounds and picnic areas - no road access (13.5 acres)		$ 188,850
2 view points		$ 3,000
Roads		
Refer to Snake River Recreation Area Plan	(Not included here)	

TABLE NO. 3 - Continued

	Estimated Cost	
	Licensee	Forest Service
Telephone Lines (Nezperce N.F.)		
Kurry Creek (6.5 miles)		$ 10,000
Sheep Creek (11.7 miles)		18,000
Radio (Nezperce N.F.)		
Riggins Ranger Station (1)		500
Slate Creek Ranger Station (1)		500
Cold Springs (1)		1,000
Kurry Creek Guard Station (1)		700
Sheep Creek Guard Station (1)		700
Dry Diggins (1)		600
Granite Creek (1)		600
Patrol Boat (1)		700
(Wallowa-Whitman N.F.)		
Thorn Creek Guard Station (1)		500
Buckhorn Lookout (1)		600
Hat Point Lookout (1)		600
Patrol Boat (1)		700
Administrative Buildings and Visitor Information Centers		
Refer to Snake River Recreation Area Plan		$ 289,500
Fire Protection		
Fire breaks at 41 developed sites		$ 21,000
	$ 386,750	$2,700,425

The foregoing cost estimates are for facilities needed around the reservoir and along the main access routes. Additional estimates covering a wider area may be found in the Snake River Recreation Area Plan.

TABLE No. 4

Recommended Services to Meet Additional Use Created by the Project

	Items	Man Months	Estimated Cost
1.	Advance Recreation Planning	15	$ 10,000
2.	Liaison and Administrative Service	75	100,000
3.	Technical Assistance	125	125,000

TABLE No. 5-A

Economic Effect of Project on National Forest Resources

1.	Timber Production Capacity	Minor unestablished loss
2.	Forage Production Capacity (annual) (37,017 sheep months + 555 cow months)	$ 6,732.74
3.	Wildlife Habitat Capacity	Large unestimated loss to big game and upland birds
4.	Fishery Values	Large unestimated loss
5.	Occupancy Values (annual)	$ 89.00
6.	Recreation Values	Net gain due to increased accessibility by water

TABLE NO. 5-B

Forage Resource Loss Below 1510-Foot Flow Line

WALLOWA-WHITMAN NATIONAL FOREST

Allotment	N.F. Acres	A.U.M.	1963 Fee	Private Acres	A.U.M.
Cherry Creek S&H	378	540	$ 32.40	240	323
Cow Creek-Toomey C&H	173	9	4.23	61	1
Dodson-Haas C&H	111	22	10.34	413	70
Imnaha River C&H	7	3	1.41	2	1
Lightning Creek C&H	80	4	1.88	223	17
Lower Cow Creek C&H	277	19	8.93	97	8
Lone Pine C&H	737	21	9.87	503	12
Deep Creek S&G	328	141	8.46	160	45
Roland Creek C&H	318	75	35.25	65	0
Cat Creek C&H	308	87	40.89	119	18
Tryon Creek C&H	375	136	63.92	43	10
Pittsburg-Somers S&G	1117	1184	71.04	255	236
Temperance-Snake S&G	918	704	42.24	348	131
Saddle Creek C&H	29	0	0	0	0
Log Creek C&H	13	4	1.88	3	1
	5169	2569 Sheep 380 Cow	$332.74	2532	735 Sheep 138 Cow

NEZPERCE NATIONAL FOREST

Pittsburg C&H	470	175	$110.25	700	540 Cow
Big Canyon S&G	370	0	0	0	0
Kirkwood and Granite Sheep Creek S&G	1190	742	8.53	525	2115 Sheep
	2030	742 Sheep 175 Cow	$118.78	1225	2115 Sheep 540 Cow

PAYETTE NATIONAL FOREST

(Loss of 20 acres--no grazing values for domestic livestock)

TOTAL LOSS OF GRAZING FEE $451.52 ANNUALLY ON NATIONAL FOREST LANDS

TABLE NO. 5-C

Examples of Grazing Value Loss if Project Causes Cancellation of Grazing Permits

Wallowa National Forest

Allotment	Animal Months	Annual Fee (1963)
Cherry Creek S&G	16,446	$ 1,089.70
Cow Creek-Toomey C&H	1,569	737.43
Dodson-Haas C&H	3,400	2,165.78
Lightning Creek C&H	2,900	1,609.98
Lower Cow Creek C&H	1,088	1,005.21
Lone Pine C&H	1,936	948.64
Deep Creek S&G	12,530	1,026.14
Roland Creek C&H	367	268.34
Cat Creek C&H	732	364.90

Nezperce National Forest

Allotment	Animal Months	Annual Fee (1963)
Big Canyon S&G	8,667	$ 1,016.71
Pittsburg C&H	4,183	2,802.61
Kirkwood	20,067	2,307.71
Granite-Sheep Creek S&G	14,250	1,638.75

TABLE NO. 6

Recommended Schedule for Revision of Forest Service Plans

Wallowa-Whitman National Forest

1.	Ranger District Multiple-Use Plan	Beginning of construction
2.	Wallowa-Working Circle Timber Management Plan	None required
3.	Forest Recreation Plan	Beginning of construction
4.	Range Management Plan	Completion of project
5.	Wildlife Plan	Completion of project
6.	Watershed Plan	Initiate at project completion
7.	Forest Transportation Plan	Beginning of Construction
8.	District Fire Plan	Beginning of construction
9.	Communication Plan	Beginning of construction
10.	Right-of-way Procurement Plan	Initiate at beginning of construction
11.	Landownership Adjustment Plan	Beginning of construction

Nezperce National Forest

		Next Scheduled Revision	Revise By Date
1.	Snake River Management	1964 (new)	1968
2.	Timber Management	1973	1973
3.	Recreation	1968	1966
4.	Range Allotment	Current	1967
5.	Wildlife	1969	1969
6.	Transportation	1964	1966
7.	Fire	1965	1965
8.	Communications	1964	1965
9.	Information and Education	1967	1964

TABLE NO. 7

Recommended Added Personnel Following Project Completion

Position	Estimated Annual Cost	Date Needed
(Nezperce National Forest)		
Recreation and fire guards	$ 3,500	1970
Recreation and fire guards	4,000	1975
Recreation and fire guards	4,500	1980
Attack fireman (Kurry Creek)	7,000	1970
Attack fireman (Sheep Creek)	8,000	1975
Attack fireman (Granite Creek)	8,500	1980
(Wallowa National Forest)		
Recreation guard (Thorn Creek)	6,000	1967
Fire guard (Pittsburg Guard Station)	4,000	1975
Recreation and trail maintenance man	5,000	1971
Boat patrolman	4,000	1972

TABLE NO. 8

SPECIAL-USE PERMITS TO BE TERMINATED OR REVISED

Special Uses Affected by the Reservoir

WALLOWA-WHITMAN NATIONAL FOREST

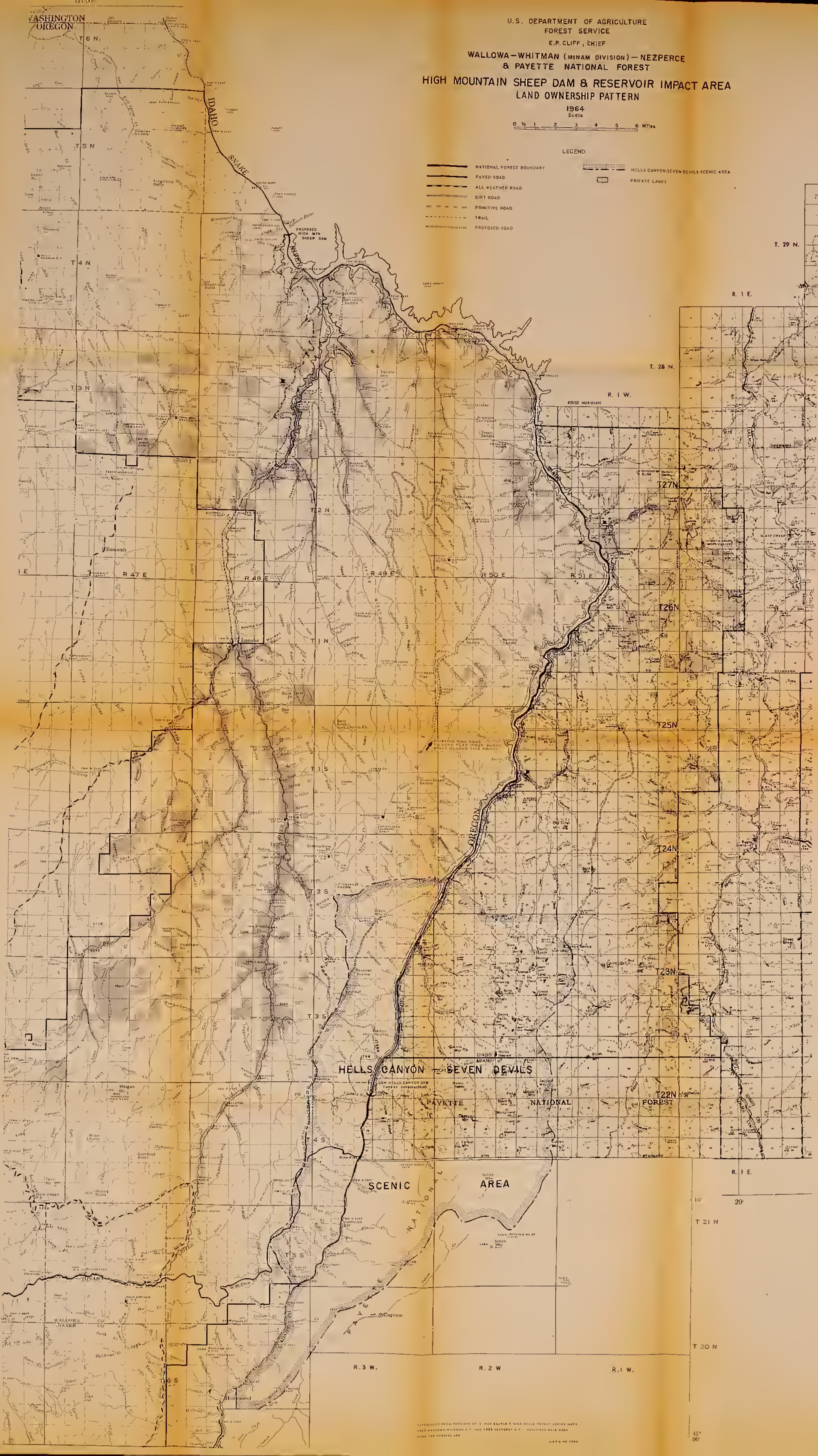
Land Use	Legal Description	Permittee - Date	
Camp Sites			
Stud Creek (Guide Camp)	SE¼SW¼, Sec. 27, T. 3 S., R. 49 E.	Ralph Page	7/16/63
Temp. Commercial Resort	Sec. 11, T. 3 N., R. 50 E.	Dick Rivers	1/01/64
Range Facilities			
Drift Fence (2-1/8 miles)	Sec. 20, 21, T. 2 N., R. 50 E.		
Drift Fence (1/2 mile)	Sec. 4, T. 3 N., R. 50 E.		
Cow Camp (50 acres)	SE¼NE¼, Sec. 20, T. 2 N., R. 50 E.	R. L. Blankinship	10/09/62
Pasture (14 acres)	SE¼NE¼ Sec. 6, T. 3 N., R. 49 E.	Eric Pearson	2/27/62
Drift Fence (2-1/2 miles)	Sec. 7, 8, T. 3 N., R. 49 E.	Eric Pearson	4/12/46
Drift Fence (1.91 mile)	Sec. 29, T. 4 N., R. 49 E. Sec. 4, T. 3 N., R. 49 E. Sec. 3, 4, T. 3 N., R. 49 E.	Eric Pearson	4/12/46
Telephone Lines			
Xmas Creek-Deep Creek Ranch (3.5 miles)	Sec. 5, 6, 7, 18, T. 3 N., R. 50 E. Sec. 32, T. 4 N., R. 50 E.	Ralph Longfellow	6/18/62
Summers Creek Ranch to Pittsburg Landing (3 miles)	Sec. 13, T. 2 N., R. 50 E. Sec. 18, 19, 20, T. 2 N., R. 51 E.	Lem Wilson, Sr.	12/15/54

TABLE NO. 8 - Continued

Land Use	Legal Description	Permittee
Roads		
Horse Creek	S½NW¼, Sec. 35, T. 3 N., R. 48 E. SE¼NW¼, Sec. 1, Lot 2 of Sec. 2, T. 2 N., R. 48 E	Kelsie Simmons
NEZPERCE NATIONAL FOREST		
Camp Sites		
Willow Bar	Sec. 23, T. 25 N., R. 2 W.	Hells Canyon Excursions
Steep Creek	Sec. 24, T. 25 N., R. 2 W.	Idaho State Fish and Game
Water Transmission Line		
Meyers Creek	Sec. 1, T. 25 N., R. 2 W.	George E. Wilson
Range Facilities		
Big Canyon Bar	Sec. 13, T. 27 N., R. 2 W.	Dave and Bruce Walters
High Bar	Sec. 14, T. 25 N., R. 2 W.	George E. Wilson
Big Bar	Sec. 31, T. 25 N., R. 1 W.	George E. Wilson
Saw Pit	Sec. 5, T. 25 N., R. 1 W.	George E. Wilson
Low Saddle	Sec. 18, T. 25 N., R. 1 W.	George E. Wilson
McGaffee	Sec. 22, T. 24 N., R. 2 W.	George E. Wilson
Old Timer	Sec. 17, T. 24 N., R. 1 W.	George E. Wilson
Wilson Cow Camp	Sec. 9, T. 23 N., R. 2 W.	George E. Wilson

TABLE NO. 8 - Continued

Land Use	Legal Description	Permittee
(Nezperce National Forest - Continued)		
Roads		
Kurry Creek - Big Canyon	T. 27 N., R. 1. W.	Dave and Bruce Walters
Big Canyon	T. 27 N., R. 1. W.	Dave and Bruce Walters


U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
E.P. CLIFF, CHIEF
WALLOWA—WHITMAN (MINAM DIVISION)—NEZPERCE
& PAYETTE NATIONAL FOREST
HIGH MOUNTAIN SHEEP DAM & RESERVOIR IMPACT AREA
LAND OWNERSHIP PATTERN
1964
Scale
0 ½ 1 2 3 4 5 6 Miles
LEGEND
NATIONAL FOREST BOUNDARY
PAVED ROAD
ALL WEATHER ROAD
DIRT ROAD
PRIMITIVE ROAD
TRAIL
PROPOSED ROAD
HELLS CANYON-SEVEN DEVILS SCENIC AREA
PRIVATE LANDS
WASHINGTON
OREGON
IDAHO
SNAKE
RIVER
Salmon River
PROPOSED HIGH MTN SHEEP DAM
T 6 N
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
T 2 S
T 3 S
T 4 S
T 5 S
T 6 S
T. 29 N.
T. 28 N.
T27N
T26N
T25N
T24N
T23N
T22N
T 21 N
T 20 N
R. 1 E.
R. 1 W.
BOISE MERIDIAN
R 47 E
R 48 E
R 49 E
R 50 E
R 51 E
Zumwalt
Imnaha
OREGON
SALMON
IMNAHA
HELLS CANYON — SEVEN DEVILS
SCENIC
AREA
PAYETTE
NATIONAL
FOREST
LOW HELLS CANYON DAM (under construction)
IDAHO
ADAMS
WALLOWA
BAKER
CO
Homestead
Cuprum
Smith Mtn
White Mtn
STANDARD
R. 3 W.
R. 2 W
R. 1 W.
10'
20'
45°
00'